# The OIL AND GAS JOURNAL

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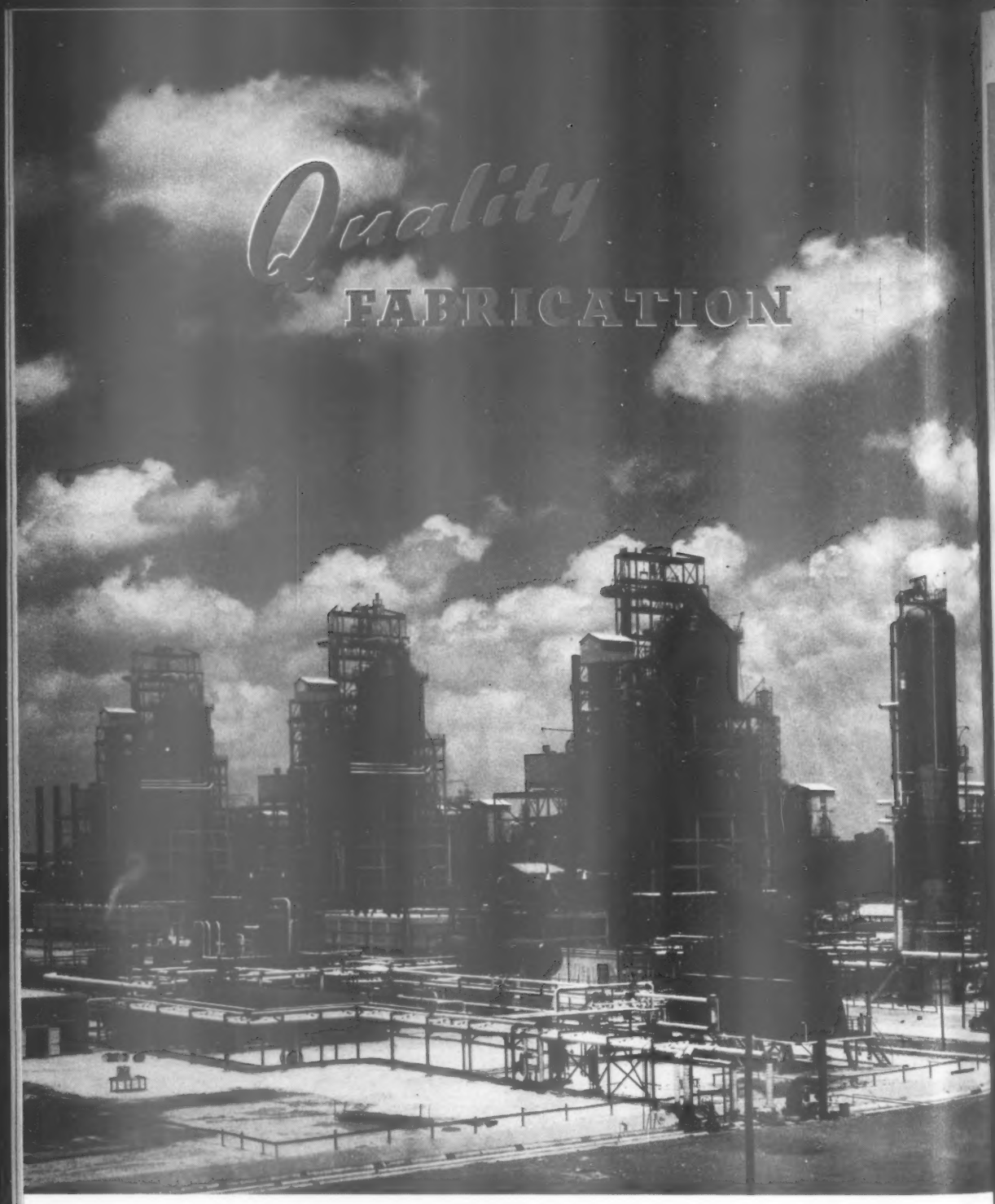


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# The OIL AND GAS JOURNAL

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HOUSTON, TEXAS

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BAKER OIL TOOLS, INC.
R. D. MC BRIAN

## BAKER EXTENDS CONGRATULATIONS AND THANKS TO PHILLIPS PETROLEUM COMPANY . . .

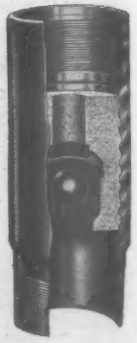
Sincere congratulations are due Phillips Petroleum Company for the forward looking planning and skillful operation in drilling the world's deepest well, which we trust will prove a profitable venture.

We appreciate the confidence which must have been placed in Baker Cement Guiding, Floating and Cementing Equipment, and the opportunity which was afforded us in contributing to the safe landing and cementing of a record-breaking string of casing.

### EQUIPMENT USED

In landing and cementing this 15,270-foot string of casing in total elapsed time of 18½ hours, the following Baker Cement Equipment was used: 2—5½" O.D. 23-pound Baker Cement Float Collars, with Baker Plastic Valve Assemblies, made principally of Baker Synthetic Resins produced by the PLASTIC DIVISION of Baker Oil Tools, Inc., and 1—5½" O.D. Baker Cement Wash-Down Whirler Guide Shoe.

All credit is due the operating personnel of Phillips Petroleum Company for the successful landing of this record string of Casing. Baker Equipment performed as expected, and without particular incident.



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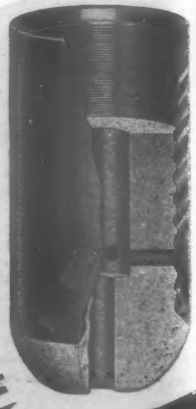


Baker Cement Wash-Down Whirler Guide Shoe

# Trends

**Crude-Oil Production By States—Page 112**

**CRUDE-OIL STOCKS** 225,112,000 bbl. as of July 29—down 182,000 bbl. One year ago 238,420,000 bbl.

**GASOLINE STOCKS** 82,665,000 bbl. as of July 29—up 515,000 bbl. One year ago 73,409,000 bbl.

**RESIDUAL FUEL-OIL STOCKS** 56,280,000 bbl. as of July 29—up 965,000 bbl. One year ago 67,361,000 bbl.

**GAS OIL AND DISTILLATE STOCKS** 38,135,000 bbl. as of July 29—up 622,000 bbl. One year ago 34,328,000 bbl.

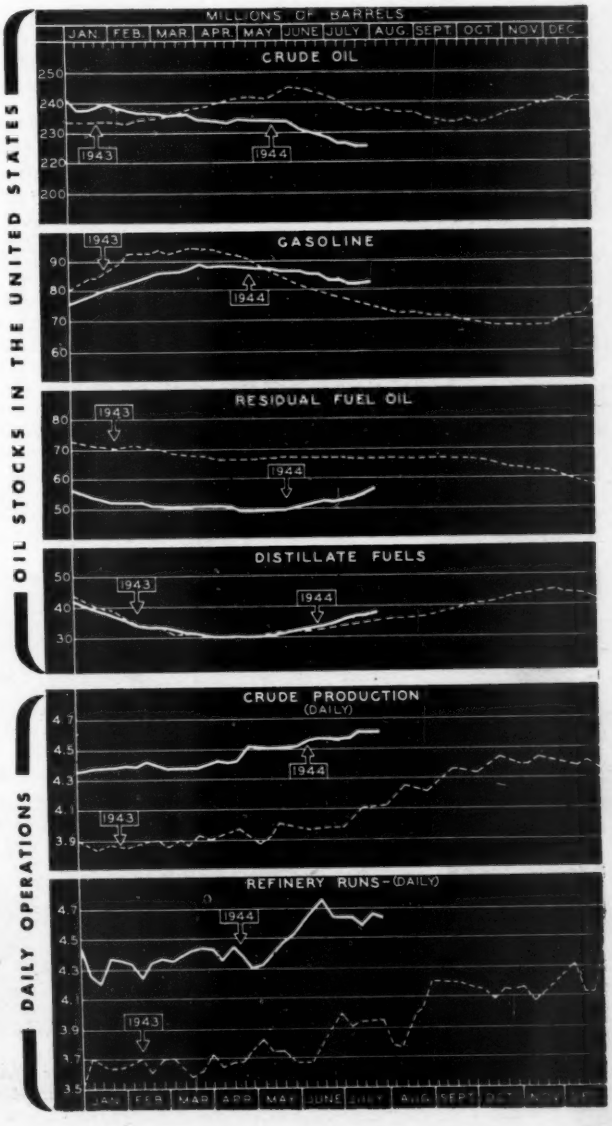
**CRUDE-OIL PRODUCTION** 4,616,400 bbl. daily average week ended Aug. 5—down 1,050 bbl. Year ago 4,208,025 bbl.

**REFINERY RUNS** 4,627,000 bbl. daily week ended July 29—down 43,000 bbl.* Year ago 3,769,000 bbl. *Revised July 22.

THE difficulties with which the general and special committees of the five PAW districts are constantly confronted in balancing petroleum supplies and needs, are revealed in the latest report of the industry's committee for District 2 covering part of that area's operations. The district consists of the Middle West and Oklahoma, one of the largest petroleum-consuming sections in this country; an area which has become a major supplier of war products from petroleum and one in which the essential industrial and agricultural demands exceed those of any other district.

THE report shows that District 2 obtains 904,000 bbl. daily, or 62 per cent, of its crude-oil supplies within the district. A total of 531,000 bbl. daily, or 37 per cent, is brought in from District 3, with 9,000 bbl. daily from District 4. After producing or bringing into the district this supply, aggregating 1,440,000 bbl. daily, 115,000 bbl. daily is accounted for by exports, transfers and losses; 136,000 bbl. is shipped to refiners in District 1 and 2,000 bbl. to District 3 refineries. This leaves 1,191,000 bbl. daily for the refineries within District 2. The report covers only the local production and the in-and-out shipments of crude oil. It does not reveal the further complications that result from movement of refinery products. District 2 supplies District 1 and other adjoining districts with large quantities of finished products. At the same time substantial supplies of practically all refinery products are brought into District 2 from other districts. The war, with its changing demands for military and civilian petroleum products, has greatly complicated the balancing of these incoming and outgoing movements. The success of committees in handling this problem is reflected in the fact that no serious shortages have occurred anywhere this year.

THOUGH encouraged by recent developments, the committee's analysis concludes that "favorable factors must not be permitted to obscure the fact that the production in District 2 is still downward. The production of sweet crude oil in District 3 is at or near the maximum efficient rate. The record high level of refinery runs in District 3 is causing a sharp reduction in sweet crude in that district, while sour crude stocks are increasing."



# Reduction in Demand, With End Of the European War, Is Not Expected To Be Drastic

***by John P. O'Donnell***

NEW YORK. — Germany's defeat, now generally anticipated before winter, is not expected to result in a sufficiently drastic change in the petroleum demand picture to upset the economy of the industry. At least this is the majority view of a number of industry economists who, however, are even more cautious than usual in qualifying their projections because of the uncertainties involved and the lack of information on which to base estimates.

Because the industry's operations are now at an all-time high and the bulk of the war products is moving to the European theater, many oil men feel that as soon as the war there is over, a substantial reduction in demand will develop. Since Germany's defeat now appears to be imminent, they feel that a peroid of radical adjustment is at hand.

Those who believe that the change following Germany's capitulation will not be drastic cite a number of bases to support their conclusion:

1. Essential rehabilitation work such as highway, bridge and railroad construction will require the use of oil;

2. The army of occupation will need oil though obviously on a vastly reduced scale;

3. The war against Japan will be intensified with consequent increasing demands in that theater;

4. Because of the greater distances involved consumption per unit will be much higher in the war against Japan, particularly for air and naval craft;

5. Relaxation of rationing could absorb gasoline under aviation grade now going to Europe;

6. Replenishing of depleted stocks in this country could absorb some crude and certain products.

### Considerable Guesswork Involved

Since few of these factors are susceptible to accurate analysis, an estimate of their cumulative effect involves considerable guesswork. Some can be overestimated such as the desirability of adding to stocks. Stocks of crude oil, gasoline, kerosene, distillate, and residual fuel oil have dropped more than 65,000,000 bbl. since Pearl Harbor. This might be regarded as an indication that additions in like amount might be made. However, more than 30,000,000 bbl. of this reduction was made in residual fuel-oil stocks in California and it would be neither advisable nor desirable to replace them. Moreover, additions to gasoline stocks would have to be confined to the coastal areas since interior stocks are at prewar levels.

Because of these offsetting factors, the decline in demand following Germany's surrender may well be less than generally expected. Estimates of the drop in total demand for crude and products in 1945, assuming the war against Germany ends this year and that against Japan continues through all or most of 1945, from a low of 100,000 bbl. per day to a high of 255,000 bbl. The latter estimate was made by C. L. Burrill, Standard Oil Co. of New Jersey, before the American Institute of Mining and Metallurgical Engineers in February. On the basis of his estimate then of 1944 demand, this would be a drop of a little more than 5 per cent. The more optimistic estimates envision a decline in the order of 2 per cent.

Thus if Germany is defeated this fall and there is a time lag of a year before Japan's fall, the oil industry will have an opportunity to prepare itself for the marked decline that will follow immediately after the end of the war on all fronts. At that time the demand for all products is expected to drop below 1941 levels.

During July of this year runs to stills approximated 4,630,000 bbl. per day, 23 per cent higher than the rate of 3,757,000 bbl. in July 1941. Therefore if the immediate postwar demand is below 1941 levels, it is plain that the industry will have to curtail operations drastically to avoid the serious repercussions of oversupply. From present indications a reduction of 20 per cent or more, equivalent to approximately 1,000,000 bbl. a day, in the present rate will be necessary to bring supply into line with demand.

### Impact Will Be Eased

If automobile production is resumed between the defeat of Germany and that of Japan, it will ease the impact of the end of the war on the industry. Passenger cars normally consume two-thirds of all gasoline, the major product of the refinery. By the end of 1945 there may be 12.5 per cent fewer cars operating than at the end of 1941 and, even if these cars, out of repair and lacking rubber, do consume at the 1941 rate, 700 gal. per year, consumption in this all-important field will be lower in proportion to the number of cars which have been scrapped.

Not only will the industry find it necessary to reduce operations when the war ends but it will also be necessary for it to revise its basis of operation from wartime schedules. Marked declines are expected in demand for gasoline and residual fuel oil while kerosene and distillate fuel oil should not change much. Naval and industrial demand for heavy fuel oil should drop substan-

*Increased civilian consumption of gasoline and other products, once the war is over, will partially offset reduced military demand*

tially while domestic heating oil, with a negligible drop in the number of installations, should remain fairly stable. Diesel demand is expected to run well ahead of prewar levels.

In summary, the postwar problem of the industry will be to reduce production and runs substantially and swiftly and revise refining scheduled to yield less gasoline and residual fuel oil and more kerosene and distillate fuel oil. If such adjustments are not made promptly, the industry will face a period of serious difficulty until the adjustment ends with expected increases in all categories sufficient to absorb wartime capacity, an eventuality which is unlikely to develop for possibly 2 years after the war.

# New Materials Control Program Would Permit Long-Range Plans

WASHINGTON. — New plans for control of materials used by the oil industry are being worked out by the Petroleum Administration for War in cooperation with the War Production Board in an effort to permit operators to schedule their orders farther in advance than the present system permits.

Officials believe that the defeat of Germany any time in the next few months will not reduce demands for petroleum nor the oil industry's requirements for material, and also that it may not mean much immediate increase in the amounts of steel and other materials available for the oil industry. However, many shifts in war production schedules are anticipated and this may permit longer-range planning for materials allocations.

Plans now under discussion are designed to permit oil operators to place materials orders much farther ahead than is now permitted by the present system of quarterly allocations. The plan will apply to all production operations and to maintenance, repair, and operating supplies for all branches of the industry. PAW quotas for the fourth quarter of this year are now being compiled, and it is probable that the next allocation will be for the first half of 1945. This would place PAW requirements for both domestic and foreign operations more nearly on a par with long-range planning for lend-lease and other materials claimants. One phase of the new program may give PAW district offices greater responsibility in allocating materials, but this point has not yet been decided definitely. Oil operators favor the district office plan.

# Final Amendment on OPA Subsidy List

WASHINGTON. — The Office of Price Administration, following issuance of its final amendment to the list of fields under the stripper-well subsidy plan, has announced several changes in fields, prices and corrections of field designations.

Illinois.—Premiums have been reduced in the Dundas Consolidated field (Richland and Jasper counties) from 35 cents as previously announced to 20 cents, and in the Inman field (Gallatin County) from 25 cents to 20 cents. The South Noble pool, Richland County, has been added to the list, with a subsidy price of 20 cents.

Michigan.—North Buckeye field, Gladwin County, added at 20 cents.

Texas. — Several corrections are made. In the designation, "All Pools, Montague County," Barner field is corrected to Bowers. In Shackelford County, Joy is corrected to Ivy. In Stephens County, the Stroud deep pool is added to those excepted from the subsidy list. In Wilbarger County, Rogers-McCrary field is added to the list of exceptions, and in Young County, Davis pool is corrected to Daws pool, Upton-McLester is corrected to Lupton-McLester, and Servell to Sewell. Two exceptions are added in Young County, Edmunds pool and Burns-Ragland-Strawn pool. In Callahan County, Scranton pool receives a subsidy price of 25 cents.

A letter to all state authorities was to go out from OPA this week, asking cooperation in the subsidy program and outlining the type of information various operators will need from the state groups.

At the same time, it was learned that decision is expected shortly on methods of including California fields in the stripper subsidy program. An announcement on this is expected from OPA this week.

## Montana Board Pushes For Higher Crude Price

DENVER.—The Montana Oil Conservation Board has adopted a resolution urging the vigorous prosecution of the effort to obtain higher ceiling prices for crude oil through the enactment by Congress of the Disney bill after declaring that the subsidy payments put into effect by the price administrator's order of July 10 will not accomplish the purpose desired and will result in inequities. Out of 23,750 bbl. anticipated daily in Montana fields in August, it declares only 6,600 bbl. daily or 28 per cent, will be subject to subsidy payments and remaining 62 per cent will be subnormally priced crude. It estimates the subsidy payments on August production, based on the May output, will be only $2,289.65, of which $592.90 will go to the major companies, $812.35 to large independents and $884.40 to small independents.

## Regulations Tightened on Public Domain Leases

DENVER.—Action of the General Land Office in tightening up regulations and noncompetitive leases on the public domain has resulted in considerable discouragement among smaller operators in the public land states. The regulations, effective July 14, provide that the applicant must pay half of the first year's rental (25 cents an acre) upon making application for a lease, which must also be accompanied by a statement that the applicant is ready to furnish bond and pay the balance of the rental upon demand.

Failure to comply means the application will be rejected and the case closed without opportunity to appeal. Operators with limited capital who make a practice of assembling blocks and getting them in condition for submission to large companies, a procedure which the companies often prefer, are the hardest hit by the new regulations.

## Pressure-Maintenance Experiment Authorized

EL DORADO, Ark. — Carter Oil Co., Tulsa, last week was authorized to drill, equip and operate a salt-water-disposal and pressure-maintenance experimental well in the Magnolia field, Columbia County, Arkansas. Approval was granted by the Arkansas Oil and Gas Commission for the well which will be in the C SW NE 30-17s-19w.

If the experimental work is successful, Magnolia operators plan to install a field-wide pressure-maintenance project.

# Anglo-American Representatives Sign First Formal Oil Agreement

by Henry D. Ralph

WASHINGTON.—Acting Secretary of State Stettinius, for the United States, and Lord Beaverbrook, for the United Kingdom, affixed their signatures Tuesday, August 8, to the Anglo-American oil pact. The document, which effects an agreement on world oil policies, looking to a solution of competitive problems, is designed to be a major contribution to international security and a sound peace after the war.

The agreement follows generally the preliminary conclusions of a conference of technical experts of United States and England here last spring, but is considerably more specific. It lays down broad principles for international development and trade designed to supply adequate petroleum to all countries cooperating in international peace collaboration. It will not be effective until the two governments exchange proper notifications, and can be terminated on 3 months' notice by either country. It is considered an interim agreement, and other nations will be invited to join a world petroleum conference to negotiate a similar agreement for general adherence.

Principles laid down by the agreement include: Assuring availability of petroleum to all peaceable countries at fair prices and on a nondiscriminatory basis; development of petroleum resources with a view to sound economic advancement of producing countries; equal opportunity in obtaining concessions; respect for valid concession contracts; freeing production and distribution from unnecessary restrictions.

The agreement provides for the establishment of an International Petroleum Commission composed of representatives of the two governments charged with the responsibility of estimating world demand and recommending to member governments the best means for meeting it. If approved by the governments, such recommendations will be issued with a view to their adoption by companies operating in world oil trade. The commission will also investigate and make recommendations on Anglo-American oil problems.

The introductory article states that the two governments recognize:

"1. That ample supplies of petroleum, available in international trade to meet increasing market demands, are essential for both the security and economic well being of nations.

"2. That for the foreseeable future the petroleum resources of the world are adequate to assure the availability of such supplies.

"3. That such supplies should be derived from the various producing areas of the world with due consideration of such factors as available reserves, sound engineering practices, relevant economic factors, and the interests of producing and consuming countries, and with a view to the full satisfaction of expanding demand.

"4. That such supplies should be available in accordance with the principles of the Atlantic Charter and in order to serve the needs of collective security.

"5. That the general adoption of these principles can best be promoted by the international agreement among all countries interested in the petroleum trade whether as producers or consumers.

"Pending a general international conference and agreement, the two governments pledge to direct their efforts with respect to petroleum resources held by nationals of either country.

"1. That, subject always to considerations of military security and to the provisions of such arrangements for the preservation of peace and prevention of aggression as may be in force, adequate supplies of petroleum shall be available in international trade to the nationals of all peaceable countries at fair prices and on a nondiscriminatory basis.

"2. That the development of petroleum resources and the benefits received therefrom by the producing countries shall be such as to encourage the sound economic advancement of those countries.

"3. That the development of these resources shall be conducted with a view to the availability of adequate supplies of petroleum to both countries as well as to all other peaceable countries, subject to the provisions of such collective security arrangements as may be established.

"4. That, with respect to the acquisition of exploration and development rights in areas not now under concession, the principle of equal opportunity shall be respected by both governments.

"5. That the government of each country and the nationals thereof shall respect all valid concession contracts and lawfully acquired rights, and shall make no effort unilaterally to interfere directly or indirectly with such contracts or rights.

"6. That, subject always to the considerations mentioned in Paragraph 1 of this article, the exploration for and development of petroleum resources, the construction and operation of refineries and other facilities, and the distribution of petroleum shall not be hampered by restrictions imposed by either government or its nationals, inconsistent with the purposes of this agreement."

Both countries agree to keep informed on the foreign oil activities of their nationals and to inform the joint commission and also agree to carry out by all constitutional procedures the recommendations of the commission.

## Tanker Fleet Additions Nearly 2 Million Tons

NEW YORK.—"Additions to our tanker fleet during the first 6 months of this year totaled 118 units of 1,215,536 gross tons and 1,929,415 deadweight tons," President J. Lewis Luckenbach told directors of the American Bureau of Shipping at their semiannual meeting last week. "This rate of production is scheduled to continue throughout the year so that we will have constructed more tanker capacity than was ever produced before in the world's history in 1 year.

"These tank ships added to our tanker fleet, plus the tankers on order yet to be completed, less sinkings, will come close to equaling in capacity the entire world tanker fleet existing before the war. Certainly it is twice as large as any tank fleet existing under one flag today. All of the units constructed this year to date are of large capacity, over 16,000 tons, having speeds ranging from 16 to 18 knots."

Directors present included Thomas E. Buchanan, Texas Co.; Bushrod B. Howard, Standard Oil Co. of New Jersey; Williard F. Jones, Gulf Oil Corp.; Richmond B. Kelly, Tide Water Associated Oil Co., and Charles H. Kunze, Socony-Vacuum Oil Co., Inc.

# THIS WEEK

**DRILLING**—Eighty-eight rotary rigs, greatest concentration of such units in the world, now running in West Edmond field, Oklahoma. . . . Seventy-nine strings of tools operating in Allegany field, New York. . . . There are now 1,560 rotary rigs running in the United States, largest number in 5 years. . . . ¶Barnsdall Oil Co. and Sohio Petroleum Co. jointly purchase name and assets of Fain Drilling Co., Tulsa. . . . Equipment includes 10 rigs. . . . Other oil organizations seeking to buy drilling outfits. . . . ¶American Association of Oilwell Drilling Contractors says there are enough rigs for wells not exceeding 5,000 ft., but not for holes below that depth. . . .

**BOMBINGS**—Leo T. Crowley, foreign economic administrator, says Germany faces disastrous oil shortage as result of systematic Allied bombings of fields and refineries. . . . Drawing heavily on limited reserve stocks. . . . ¶General Doolittle says aerial assaults have seriously crippled 23 Nazi refineries and synthetic-oil plants. . . . ¶More than 1,000 U. S. heavy bombers from Italy and Britain struck at German oil resources in France last week. . . . Refineries at Bremen, Hamburg and Harburg blasted. . . . ¶Russians this week captured Drohobycz, prewar Poland's biggest oil center. . . . Reconquered the last of 2,000 Galician oil wells, which had been feeding the German war machine. . . .

**TRANSPORTATION**—ODT to conduct tests of wooden barges to determine whether they can move crude oil efficiently. . . . Twelve craft to be used, on Mississippi River, carrying cargoes against the current. . . . ¶PAW asks Atlantic Refining Co. to move 41,000 bbl. of oil daily from its Midland loading rack in West Texas Permian basin, beginning September 1. . . . Half to go to California, the rest divided between Middle West and East Coast. . . . ¶Big slug of gasoline being sent through Little Big-Inch from Texas to Northeast to relieve tight situation. . . .

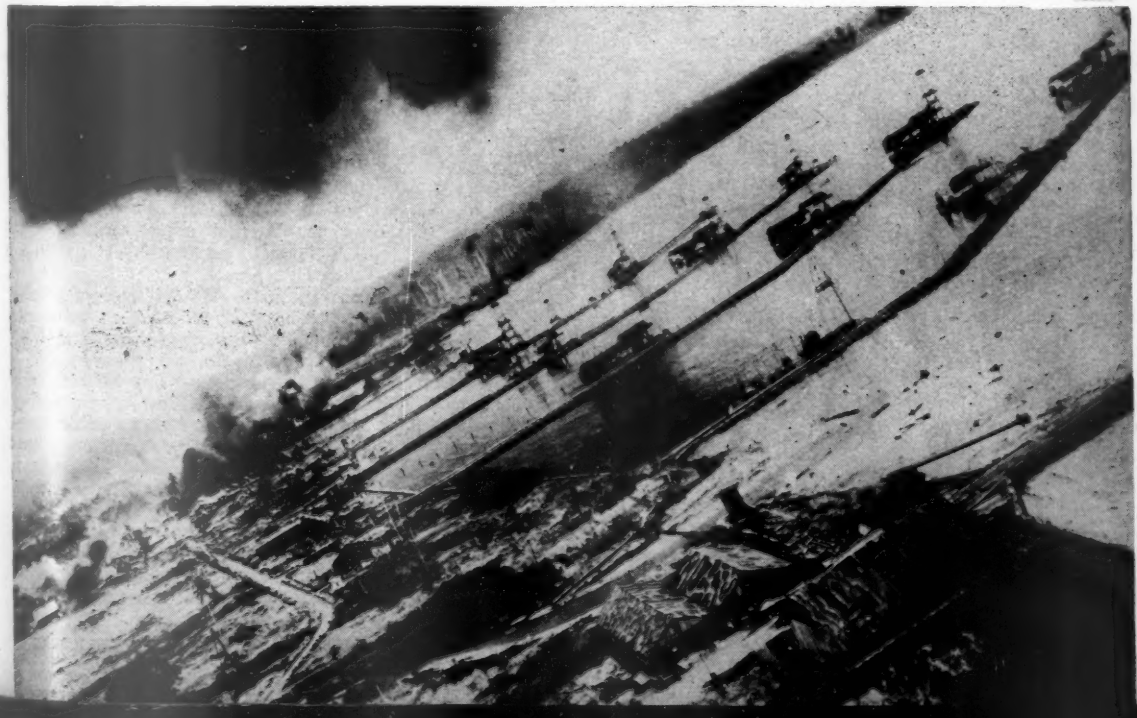
**SHORTAGES**—New PAW regulations permit operators to place purchase orders for critical materials needed for production and repair through 1945. . . . This effects marked relaxation of present restrictions, which limit such orders to a maximum of 105 days preceding delivery. . . . ¶Lack of heavy-duty tires so critical that WPB gives recruitment of workers priority over aircraft. . . . Former tire workmen over 30 and now in war service in this country to be furloughed back to tire manufacturers. . . .

**PRODUCTION**—Cities Service Oil Co. proposes to institute water-flooding program in south end of Oklahoma City field. . . . First on this huge structure. . . . ¶West Edmond field, Oklahoma, brought in its hundredth producing well. . . . Recorded another half-mile extension to the south, where Denver Producing & Refining Co. 1 Stillington began flowing. . . . No gage available. . . .

**INTERNATIONAL**—First international trade agreement for postwar period was closed Tuesday with signing of Anglo-American oil pact . . . Principal feature will be commission on oil moving in international trade. . . . Regarded as important step toward assuring a workable plan for world oil development after the war. . . .

*Fifth Air Force bombers are cutting deeper into Japanese held oil supplies in the Netherlands East Indies. Storage area, left center, received brunt of this attack on Boela, Ceram. Awry angle of the picture is caused by the plane tilt from which this U. S. Army Air Force photo was taken*

Acme



# Systematic Campaign Under Way To Destroy German Oil Supplies

WASHINGTON. — Beginning in April, increasing in May and reaching an even higher scale in June and July, a systematic campaign of destruction of the crude-oil refineries, the hydrocarbon synthesis plants, and the hydrogenation units in Axis Europe has been undertaken. This program, accounting for almost daily mention of petroleum targets in communiques concerning activities of European based air forces, was disclosed here last week by Leo T. Crowley, foreign economic administrator.

Although Germany has countered with restrictions so drastic that she has even retarded her war industries and war-agricultural programs, Crowley reported, she still must draw heavily upon the limited reserve stocks previously accumulated.

Germany is now facing her most critical oil shortage. At the beginning of the war she had built up substantial stockpiles. Whatever oil she consumed in the early stages of the war, she was in the main successful in replacing with oil seized from the occupied countries. It is true that Germany failed to obtain the rich oil fields of the Caucasus, but she was able to recover from this setback by expansion of those oil-producing resources available to her.

The important German crude-oil refineries are in the Hanover and Hamburg areas of Germany proper, in the Vienna area, and in the Ploesti area of Romania. Her intricate synthetic oil plants, some of which cover 4 to 5 sq. miles and produce many byproducts in addition to oil for the Nazi war machine, are mainly in the Ruhr Valley, the Leipzig area, and in Silesia. These plants were greatly expanded whenever possible after the outbreak of the war, and especially after it became apparent to the Germans that they would be unable to seize the oil of the Caucasus. Approximately half of Germany's oil products are synthetic.

Before April of this year the damage caused by Allied bombings had not had a serious effect on Germany's oil supply. Repairs to those synthetic plants and crude-oil refineries accessible to Allied bombers could be made with relative speed. Moreover, there was available in the western Axis and occupied countries considerable excess refining capacity. Crude oil could thus be diverted from damaged to undamaged refineries.

But with the advance of the Allied armies, the further development of precision bombing, the establishment of the shuttle-bombing bases in Russia, and other factors, many additional plants became exposed to systematic attack from the air. Furthermore, the Germans are no longer in position to repair promptly the damage done to the synthetic plants and crude refineries. This is due to critical shortages in replacement equipment such as control instruments, pumps, compressors, motors, and many other specialized items needed in these complex plants, and above all, to lack of technical personnel.

# Bombing Follows Definite Pattern

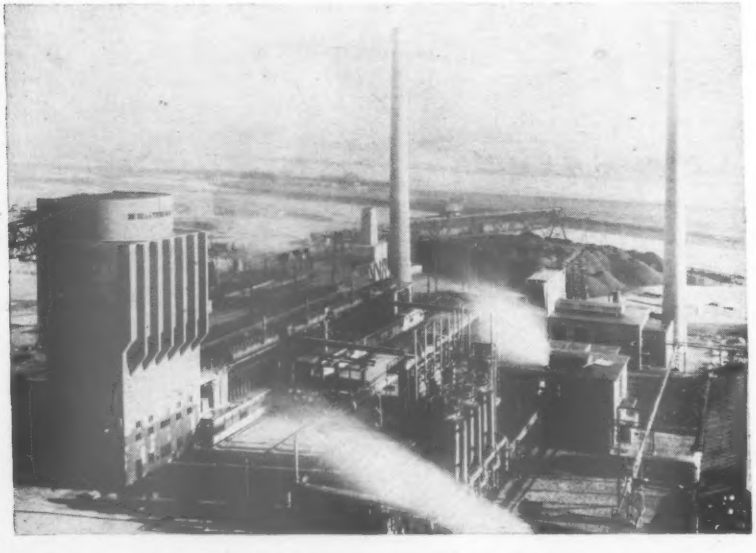
LONDON. — Penetrating smoke screens and fighting through swarms of interceptors, 500 United States heavy bombers scored hits August 7 on two synthetic-oil plants deep in the reich. These plants produce much of Germany's high-grade motor fuel, and one of them is the third largest Nazi synthetic plant still operating. They are at Blechhamer, 75 miles southeast of Breslau. The raiding bombers were from the Fifteenth Air Force, based on the Mediterranean.

A force of Liberators, heading into the Balkans, smashed oil installations on the Danube at Novi Sad, northwest of Belgrade. The same raiders pounded an enemy airfield at Alibunar, 21 miles northeast of Belgrade. American Mosquitos continued the battering of Hitler's dwindling oil supply by striking at a synthetic-oil plant at Castrop-Rauxel, near the eastern end of the Ruhr. Lt. Gen. James H. Doolittle, commander of the Eighth U. S. Tactical Air Force, said aerial bombings had crippled production seriously at 23 of Germany's major oil refineries and synthetic-oil plants.

More than 750 Fortresses and Liberators based in Italy bombed oil-storage installations in the Rhone Valley August 6. They blasted four oil refineries in the Hamburg area and an airfield near Magdeburg.

Soviet forces in the Carpathian Mountains on August 7 reconquered the last of 2,000 Galician oil wells which had been supplying the German war machine.

On the preceding day the Russians dealt a smashing blow to enemy petroleum supplies by capturing Drohobycz, prewar Poland's most important oil center. Other Russian armies were poised this week in Rumania for a possible resumption of the drive on the Ploesti oil fields in that country. Drohobycz is the principal city of the rich Galician oil region, and pipe lines link it with



*Low-temperature carbonization plant at Magdeburg, Germany, which lies in the area which has recently been pounded by American Air Force bombers*

the great Boryslaw oil wells. Hitler's war machine thus has lost one of the most vital sources of its life blood, leaving only the Ploesti oil fields as a major source of supply.

Oil refineries at Hamburg and at Harburg, across the Elbe River from Hamburg, were targets for some 1,200 American heavy bombers, protected by 1,000 fighters, on August 4. A refinery at Bremen was bombed by the same air force.

## Conditions in Midwest Hopeful, Says Committee

CHICAGO.—Output of refined-oil products during the 4 weeks ended July 15 was at highest level of the year in District 2 (Middle West) of Petroleum Administration for War, according to a report released by the general committee of the district. Stocks of these products showed further improvement in comparison with those of a year ago, and new supplies of crude were sufficient to support the increased runs to stills. The report points out that the improvement in the district's refinery operations has been accomplished without impairing the district's over-all crude oil stock position.

The relatively favorable over-all problem, however, tends to obscure certain problems with which the industry in the district is faced, it is asserted. Included among developments emphasized in the report are the following:

1. Stocks of sweet crude oil are being depleted at a rapid rate, particularly in District 3, while sour-crude stocks are increasing. Unless additional sweet-crude production is developed, increasing dependence upon sour-crude supplies is inevitable.

2. The District 2 crude-oil production outlook is somewhat more encouraging, but the trend is still downward and greater receipts of crude oil from District 3 or District 4 will be required.

3. Recent yields of distillates in District 2 have been inadequate in the light of anticipated military and rationed civilian requirements. Prompt compliance with the PAW's request of July 14, to increase distillates yields is therefore essential.

4. A comparison of the current position of District 2 with a year ago shows that:

(a) Crude runs are about 67,000 bbl. a day higher.

(b) Stocks of the Four major products are up 5,600,000 bbl.

(c) Civilian demand for gasoline is slightly less.

(d) Motor gasoline stocks are up about 3,000,000 bbl.

(e) By reason of higher crude runs we are actually manufacturing more motor gasoline.

5. Imports of motor gasoline are about the same, and exports to District 1 are less than they were last year.

6. Excluding for the moment the stocks on hand and considering only imports plus manufacture, less exports to District 1, we have each day a greater quantity of motor gasoline with which to meet the demand within District 2.

"The inability to secure adequate tank-car transportation, particularly for crude oil, is probably the most difficult problem in the district," the report states. "Further, if the available transportation is to be used efficiently, maximum quantities of finished products should move in tank cars to District 1 from District 2 origins instead of from District 3.

"The failure of District 2 refineries to receive programmed quantities of West Texas crude oil has not prevented the industry from maintaining crude runs to stills at the relatively high level of 1,203,000 bbl. a day in the 4 weeks ended July 15. This level represented a gain of 18,000 bbl. a day from that of the 5 weeks ended June 17.

"Crude runs to stills in District 1 in the same period declined 32,000 bbl. daily to 705,000 bbl. daily, while District 3 extended its gains by increasing its runs moderately to 1,725,000 bbl. daily. This rate was 25,000 bbl. daily above the supply program," according to the report.

"The necessity for maintaining crude oil runs to stills at the highest possible level by every means available should now be well understood. Suffice to say, recently projected increases in military requirements apparently are being realized in actual military takings and are expected to continue as long as the present scale of military operations is maintained."

## Gilcrease Buys Controlling Interest in Valley Osage

Controlling interest in Valley Osage Oil Co., Tulsa, has been bought by Thomas Gilcrease, of San Antonio, and associates. Gilcrease was made president of the company at an organization meeting last week, succeeding W. A. Goforth, who sold his holdings to Gilcrease. Properties involved include 139 producing oil wells on 26 proven blocks in Oklahoma, Kansas and Texas, with a daily production under proration of 400 bbl. net. Chief producing properties are in Texas, with some in the East Texas field which are prorated at a low figure.

No consideration was announced but oil men say such properties and production would bring around $1,000,000.

Executive and operating departments of Valley Osage will be moved to San Antonio but the company will maintain its office in Tulsa with T. H. Gilbert, vice president, in charge. Gilbert was elected vice president at the meeting last week, and E. L. Ames, of Gilcrease Oil Co., was made vice president. In a joint statement, Goforth and Gilcrease stated all field employes of Valley Osage would be retained.

Goforth stated that after a short rest, he will open an office in Tulsa, and continue in the oil business as an independent operator.

## Moses Named Carter Vice President

Harold F. Moses has been elected a vice president of The Carter Oil Co. and named head of exploration and research, O. C. Schorp, president of the company announced Tuesday. Moses has been manager of exploration with the Carter since May 1941. He joined the company as a geologist in 1934, became division geologist in the eastern division in 1935, and in 1938 was named assistant manager of exploration and chief geologist.

## Little Big Inch Takes Slug Of Gasoline to Northeast

WASHINGTON. — Gasoline supplies in the Northeast will be eased somewhat by a substantial slug which is being sent from Texas by way of the Little Big-Inch pipe line, according to Petroleum Administration for War. It is calculated it will be at least a month before this shipment will be available, however, as it requires about 12 days to build up enough stock to start the slug through the line and another 16 days for the first batch to reach the Linden, N. J., terminal.

Ralph K. Davies, deputy petroleum administrator, discounted reports that stocks were so low in the Northeast that some motorists would be unable to redeem all their legitimate coupons. In August 1941, East Coast storage tanks held about 22,600,000 bbl. of motor gasoline; now stocks have dwindled to 8,000,000 bbl.

The new report on tanker shipments for the week ending July 29 showed only 59,520 tank cars in East Coast service, compared with 74,000 that were shipping products and crude oil into the East in June 1943. The reduction is explained by transfers to the Gulf Coast-West Coast military service and Gulf Coast-Midwest hauls to midwestern refineries.

Loadings reported by individual companies brought the week's total shipments to an average of 678,656 bbl. a day, a decrease of 5.4 per cent from the previous 7 days.

# New System of Ration Evidence Established for Federal Agencies

### Change Designed to Provide Better Record of Military Uses

WASHINGTON.—The Army, Navy, Marine Corps, Coast Guard, Maritime Commission and War Shipping Administration will get their supplies of gasoline and fuel oil under a new system of ration evidences, the Office of Price Administration announced last week.

This new procedure was worked out at the request of the Army and Navy. It is designed to help them establish more efficient control over the issuance of rations to their personnel and to provide a better record of military and naval consumption of rationed fuel.

The change will abolish OPA Form R-544, the ration evidence now used by these agencies for all purchases of gasoline and fuel oil. The R-544 will become invalid on September 1, 1944, for use by such agencies. In its place they will now use the following methods of payment:

1. For bulk deliveries of gasoline, such as deliveries made into storage facilities or ship's bunkers, the Army, Navy, Marine Corps and Coast Guard will issue checks on ration bank accounts, which they will for the first time be authorized to open. Bulk deliveries of fuel oil made into stationary storage facilities will also be made in exchange for ration checks.

2. For other deliveries, the Army, Navy, Marine Corps and Coast Guard will use two new evidences. Acknowledgments of delivery issued on OPA Form R-594 will be used for deliveries of either gasoline or fuel oil into the fuel tanks of vehicles, boats, or equipment clearly identified as being owned or leased and operated by one of the four agencies. The amount of gasoline or fuel oil delivered will be inserted by the person accepting the delivery, who will sign his name, rank and serial number.

For purchases of gasoline delivered into the tanks of private vehicles being used for military travel, military receipts issued on OPA Form R-593 will be used. It will be signed at the time of delivery by the person accepting it, with his name, rank and serial number. This form will have a fixed value of 5 gal.

3. The War Shipping Administration and Maritime Commission will issue ration checks for all transfers of fuel oil, and for bulk transfers of gasoline. They will obtain gasoline coupons from their boards in the same manner as other civilian consumers which they will use for all purchases of gasoline other than bulk deliveries.

OPA Form R-544 will remain valid through the month of August to avoid any inconvenience that might result if the new forms, which become valid August 1, 1944, do not immediately reach all issuing officers. Gasoline dealers will be allowed not later than September 11 to exchange R-544s for gasoline with their suppliers, and gasoline distributors will have not later than September 20 to deposit them in their ration bank accounts.

# DSC Drafting New Subsidy Regulations

WASHINGTON.—Defense Supplies Corp. at midweek was working on what it hoped would be its last draft of regulations for paying premium price subsidies to first purchasers of crude from stripper fields. It was understood that this draft is much shorter and simpler than the original proposal and that it drops a number of provisions which met objections from the industry. An original suggestion was that lists of wells from which the crude was purchased be submitted each month with the claim for payment, since DSC lawyers felt that they should have positive knowledge that all oil coming under the subsidy was produced from wells which are actually strippers. Because the industry objected that this would be virtually impossible to furnish it is understood that the current draft of the regulations requires first purchasers to submit lists of the leases from which the oil was bought, and that this will be relatively easy to supply and can readily be compared with OPA definitions of premium-price fields. Another provision in the draft regulations requires purchasers to pay the full OPA ceiling price for crude in order to be eligible for the subsidy.

#### California Pools Added

A list of 30 stripper-well pools in California eligible for premium-price payments has been tentatively drafted by OPA, subject to final checking, and will probably be issued this week, retroactive to cover production since August 1.

The list comprises fields which produced an average of less than 9 bbl. per day during December 1943, according to information supplied by the Conservation Committee of California Oil Producers and certified by the California State Division of Oil and Gas. Since California is the only state where OPA acted on figures supplied by the industry instead of from state government agencies, producers are required to submit to OPA within 30 days photostats of the monthly oil production reports submitted to the California Division of Oil and Gas for December 1943. If these are not filed, or of these shown the field is not eligible for the subsidy such fields may be removed from the list or payment of the premium may be suspended for further investigation.

The following fields were listed:

**San Joaquin Valley**

Belridge, South Belridge area (shallow), 25 cents.
Kern River (all pools), 35 cents.
McVan, Creek district, 25 cents.
Pyramid Hills, 20 cents.
Sunset, Mount district, 25 cents.
Trembior Ranch, McKittrick district, 35 cents.
Wasco (shale), 35 cents.
Wheeler Ridge (all pools), 20 cents.

**Coastal Area**

Bardsdale (all pools except Elkins area), Santa Paula-Newhall district, 25 cents.
Capitan (Serf) Santa Barbara district, 25 cents.
Edna, San Louis Obispo district, 35 cents.
Ex Mission Santa Paula, Santa Paula-Newhall district, 35 cents.
Modelo, Piru, Santa Paula-Newhall district, 35 cents.
Newhall (Newhall) Santa Paula-Newhall district, 35 cents.
Santa Barbara (Vaqueros), Santa Barbara district, 25 cents.
Sargent, Santa Clara, 35 cents.
Sespe Canyon, Santa Paula-Newhall district, 20 cents.
Shields Canyon (all pools), Santa Paula-Newhall district, 20 cents.
Simi-Conejo-O'Nard (Simi), Santa Paula-Newhall district, 35 cents.
Sisar-Silverthread, Santa Paula, Santa Paula-Newhall district, 35 cents.
Summerland (all pools), Santa Barbara district, 20 cents.
Tapo-Eureka, Pier Santa Paula-Newhall district, 35 cents.
Timber Canyon, Santa Paula, Santa Paula-Newhall district, 35 cents.
Lorey Canyon, Piru Santa Paula-Newhall district, 35 cents.
Wiley-Towsley Canyon, Newhall-Santa Paula-Newhall district, 35 cents.

**Los Angeles Basin**

Los Angeles, Los Angeles district, 35 cents.
Puente Hills, 35 cents.
Lorrain area (Flint) Torrance-Hermosa, 25 cents.
Whittier-Central area, 25 cents.
Whittier, Rideout Heights area, 20 cents.

FOUNDED IN 1910

BY PATRICK C. BOYLE

the OIL AND GAS JOURNAL

# Protecting Natural Gas

THE Independent Natural Gas Association of America is seeking to protect the rights of producers, transmitters and consumers in its insistence that the issues involved in the Federal Power Commission decision relating to the Memphis Natural Gas Co. case be reconsidered. A rehearing date has been set and the new association has been granted permission to intervene.

The June FPC rulings in this case have been a matter of concern, not only to natural-gas operators but to all utilities and industries which realize the danger inherent in extension of federal powers by commission decree and which fear further encroachment of national authority in matters properly belonging to the states.

The Memphis company seeks permission to increase the capacity of its system by laying 61 miles of new line paralleling existing lines. While in previous decisions the power commission had held that it did not have the authority, under the Natural Gas Act, to consider the uses of natural gas, it reversed itself in this case.

One of the grounds for denial of the petition for increased capacity was the fact that the additional gas was to be used for boiler fuel. This initial ruling was in line with contentions of coal and railroad interests and the labor unions concerned with the "inferior" and "superior" uses of natural gas which were tied in with "social" considerations said to be involved in what is done with natural gas by consumers.

It is certain that the Congress responsible for the Natural Gas Act never intended to confer on FPC authority to regulate the uses of the fuel nor meddle with matters dealing with production and conservation within the states. Its delegated powers are confined to those matters commonly associated with regulation of interstate commerce. Should the powers enunciated in the Memphis case be reaffirmed after another hearing and be upheld by the courts, FPC would have a strangle hold on natural-gas operations, and the authority of the states in conservation matters would be nullified.

The natural-gas industry has been largely built around industrial uses. These uses account for 65 per cent of the marketed volume and approximately 50 per cent of the dollar sales in this country. Industrial sales are less seasonal than the other outlets. Without them prices to domestic and commercial consumers would have to be substantially higher. If this revenue were to be eliminated there would be no further expansion in the natural-gas industry, and parts or the whole of existing systems would have to be liquidated.

Every problem of the transmission companies would, of course, be carried back to the producers of natural gas. True conservation would not be fostered and economic and physical waste would be inevitable. Equally apparent is the fact that any extension of bureaucratic controls applying to natural gas will also circumscribe the closely allied petroleum operations. The two industries are inseparable in many operating practices.

The war will bring permanent changes in natural-gas production and transmission. Its value will be enhanced by developments in the efficient recovery of crude oil and its utilization in the manufacture of liquid products. These will necessitate operating adjustments which, as in the past, can be made best through the interplay of competitive forces, with a contraction rather than an expansion in Washington controls.

# Horizontal Drilling From Vertical Hole Pioneered in California

**by L. P. Stockman**

LOS ANGELES. — A method for drilling a hole substantially horizontally from any point in a vertical well has been developed by John A. Zublin. First tests under normal conditions are being completed in the Midway-Sunset field at a drillsite provided by Standard Oil Co. of California. The company provided the well to test the idea and equipment because it was realized that if proven successful the method would be valuable in increasing recovery from existing fields.

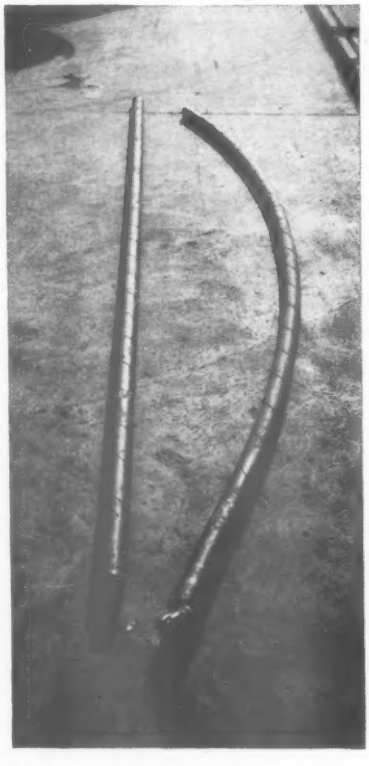
Two horizontal holes have been drilled in Standard of California 43-15-A in the Midway-Sunset field, Kern County, California. A third horizontal hole is now being drilled at the same well. The first horizontal hole was carried out a distance of 51 ft. from the axis of the vertical well and the second hole was finished 72 ft. from the axis. The third hole now being made in another direction is to be carried out approximately 100 ft. on a horizontal plane.

Because California has scored no major field discovery in several years, considerable study has been given to all possibilities for increasing recovery from existing fields. The state has produced more than 6,300,000,000 bbl. of crude oil and it is evident that if recovery from existing fields can be increased by any reasonable percentage, the production added would be equivalent to one or several major fields.

### Penetration and Drainage

Penetration and drainage are important factors and thus if both could be substantially enlarged ultimate recovery should be increased. With these advantages in mind, Zublin, a California inventor, designed the method of drilling horizontally from a vertical bore. The side hole departs from the vertical in a curving arc rather than at a right angle to the axis of the vertical hole and in the event a well is cased a window can be cut to permit exit of the bit and drill pipe.

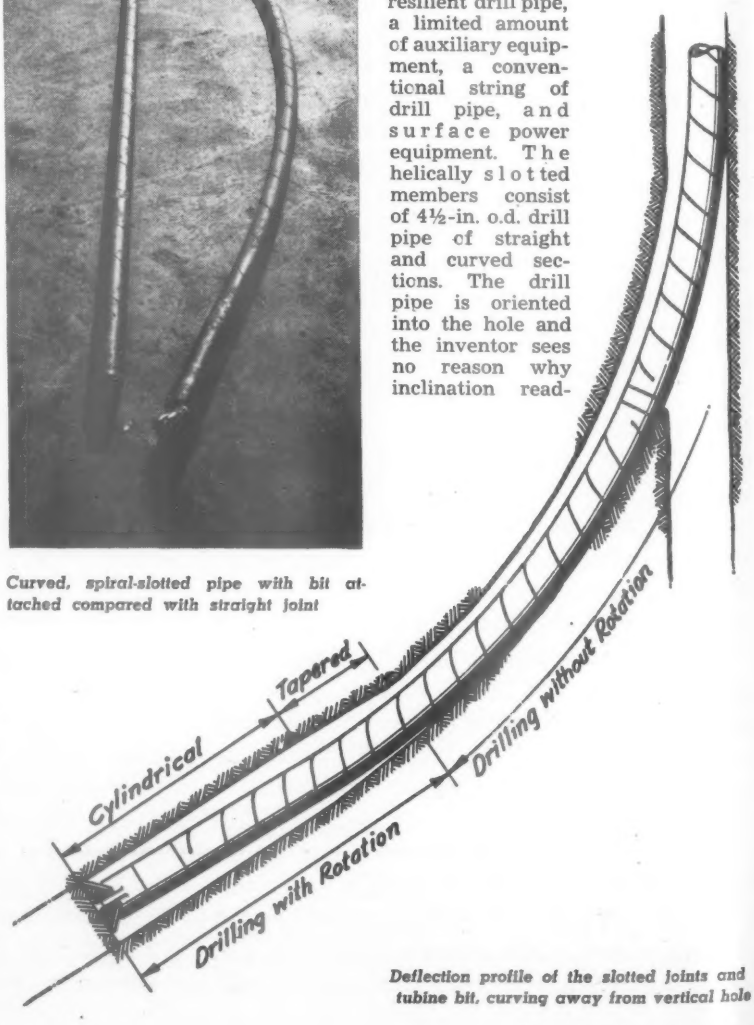
The side hole or holes can be started from a vertical hole at any predetermined point and may be extended in any direction with a curve of any desired radius, in some instances as small as 5 ft. Usually the curve will have a radius from 10 to 100 ft. This curved hole can be stopped at will and continued with a straight hole parallel with the bedding plane. The engineer at this point will obviously want to know how a horizontal hole can be maintained as in most vertical holes



*Curved, spiral-slotted pipe with bit attached compared with straight joint*

casing or liners are necessary to prevent caving. The inventor contemplates the use of one of two alternatives. If the formation is hard enough to sustain itself for a limited time it is proposed to blow in under pressure enough gravel to fill the horizontal hole. The second alternative is to case the hole with or without a gravel pack by leaving in place the drill pipe with which the hole has been drilled.

The drilling of side-hole wells is accomplished by the use of a 6½-in. hydraulically driven gyratory bit, one or more lengths of helically slotted, flexible, resilient drill pipe, a limited amount of auxiliary equipment, a conventional string of drill pipe, and surface power equipment. The helically slotted members consist of 4½-in. o.d. drill pipe of straight and curved sections. The drill pipe is oriented into the hole and the inventor sees no reason why inclination read-



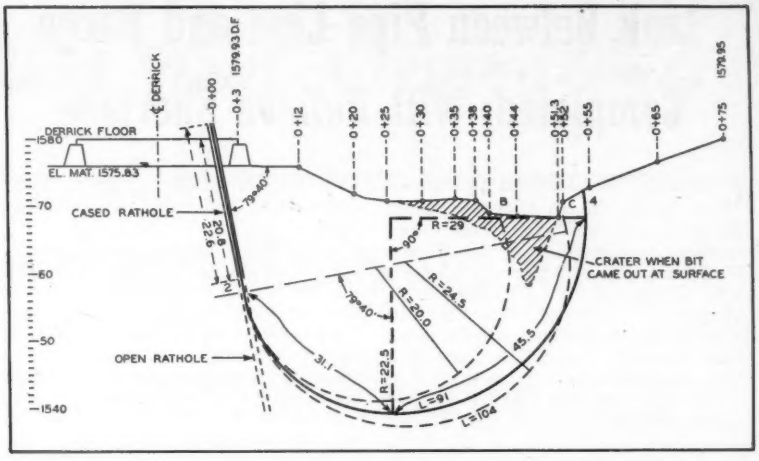

*Deflection profile of the slotted joints and tubine bit, curving away from vertical hole*

ings cannot be taken if so desired.

Circulation is maintained through this spirally slotted pipe by the use of an internal rubber member. Use of the rubber member is necessary as the bit is actuated by a hydraulic turbine working on pressure applied against the drilling fluid column at the surface and also because of the necessity of jetting drilling fluid at the point of bit contact with the formation. The turbine, shanks and bit assembly are compact as the pecular cutting action of the high-speed bit permits the use of a short turbine. The internal rubber member is inserted in the flexible section of the drilling string and securely anchored. In order to insert this member, both ends of the drill pipe are cut out and subsequently streamlined and welded. The rubber internal section is adequately anchored inside the welded sections containing the male and female ends. One section of drill pipe threads directly into another. The flexible section of the drilling string is fabricated out of conventional drill pipe by cutting a spiral slot along the length of each section. The number of spirals made in a given 20-ft. section of drill pipe determines the degree of flexibility, the greater the number of spiral slots, the greater the amount of flexibility and resiliency. Several degrees of flexibility are necessary in a single operation if a combination straight and curved hole is desired. In order to enable the bit assembly and turbine to drill laterally from a vertical hole or get through a window in a cased wall, a curved section of flexible slotted pipe is used. This section, which has been bent and slotted after heat treatment, and is therefore not under tension, is introduced into the well as a straight section by use of a mandrel. When the point is reached at which the side hole drilling is to be started, the mandrel is removed with an overshot run inside the drill pipe on a line. When the mandrel is removed that portion of the flexible pipe resumes its normal curved condition. It is this curvature in the flexible pipe that permits the bit and turbine assembly to depart from the vertical hole in an arc.

### Same Radius Hole

A 20-ft. section of this curved flexible drill pipe with a 25-ft. radius will continue to drill a hole of the same radius even after the drilled hole has exceeded the 20-ft. length of the member. If a straight section of the flexible pipe is substituted a straight hole will then be drilled. In addition to drilling a side hole out of a vertical hole it is also possible to drill a side hole out of a side hole. In drilling a curved hole with curved slotted drill pipe only the bit is employed. Rotation of the drill pipe results in the drilling of a larger diameter hole and a straight horizontal hole can be underreamed by rotating the drill pipe. This is easily understood by those familiar with the operation of a gyratory bit. Any number of side holes can be drilled from a vertical hole and this increased penetration in an oil sand substantially increases the drainage factor. This side hole drilling can be done in a few days. The first test of this equipment was made on a well of Chanslor Canfield Midway Oil Co. in the Midway-Sunset field, California, and consisted of going down the rat hole and emerging at the surface within 10 ft. of a predetermined point approximately 60 ft. away. This was done with a curved section of the flexible drill pipe and of course a bit. The test determined (1) that the equipment could get out of a vertical hole and (2) the direction and course of the bit could be determined and was controllable with reasonable accuracy.




*Profile of the first experiment. The slanted rat hole was drilled back to the surface to prove practicability of the method*

# Bureau of Ships Investigates New Super Diesel Fuel

WASHINGTON. — A high cetane diesel fuel which gives promise of having revolutionary effects is now undergoing extensive tests at one of the Bureau of Ships laboratories, Rear Adm. Edward L. Cochrane, U.S.N., chief of the Bureau of Ships, announced last week.

The tests are being conducted to determine the value of the fuel for combat service both for present and possibly new design Navy engines. The immediate use of the new fuel lies in improving the quality of low cetane fuels and augmenting the present supply of fuel for the many diesel ships in the Fleet. Its future possibilities appear to be very promising since it may make 100 cetane fuel practicable where 50 cetane is now the average for high quality diesel fuel.

The new high cetane fuel is produced from a fluid obtained by synthesizing natural gas. The quantity of fuel which can be obtained from this source represents only a small fraction of the total fuel production now obtained from natural petroleum. Used as a blend, however, it can have important effects in improving the quality of the present low cetane petroleum fuel and increasing the over-all volume of diesel fuel available for the Fleet.

A cheap source of the basic high cetane fluid is natural gas now vented into the air or wasted in uneconomical uses. The process by which the fuel is produced requires a minimum of critical alloy steel and will employ catalytic technology developed by the synthetic rubber and aviation gasoline programs. The work, being carried on under the direction of the Research and Standards Branch of the Bureau of Ships, indicates that this process will make a considerable quantity of a valuable war fuel available to aid in relieving the critical shortage of petroleum products.

# Link Between Pipe Line and Barge Completed; Will Relieve Shortage

CHICAGO. — Improved movement of crude oil up the Mississippi River to relieve the shortage experienced by refiners of the Middle West, the East and perhaps Canada will be effected by the recent completion of a two-part link between river-barge movement and the pipe-line network extending eastward from near the river.

One part of this link is a dock and unloading facilities just placed in service on the river at Hartford, Ill., by Allied Pipe Line Corp. (Allied Oil Corp.) The other part is Ohio Oil Co.'s recently completed 2-mile 14-in. pipe line connecting these dock facilities with the Wood River pumping station on Ohio's main pipe-line system, formerly known as Illinois Pipe Line Co.

In connection with the crude-oil transportation compensability plan of Defense Supplies Corp., it is believed this link will greatly stimulate the water and pipe-line movement and will make it possible for refiners in the Central West and even farther away to obtain crude economically from sources along the lower Mississippi and Gulf Coast regions.

The compensability plan extends as far westward on the gulf as Corpus Christi and Brownsville, and as far north on the river as Wood River.

The new connecting pipe line can handle in excess of 100,000 bbl. of crude a day. The dock could unload an even larger quantity if its equipment could be utilized 24 hours a day.

Interest in crude sources along the lower river has been intensified on the part of District 2 refiners by declining Oklahoma - Kansas - Illinois production. It is understood some of these refiners already are exploring possibility of using the new facility.

The only other arrangement of this kind in the Central West is that of Sohio at Mount Vernon which has had dificulty handling the large volume received.

Making possible an increasing traffic of up-river crude oil, the towboat and barge construction program of Office of Defense Transportation has been completed and is believed able to contribute to breaking the crude transportation bottleneck. This program embraces 21 towboats and 269 steel barges for operation on the Mississippi River and its tributaries.

The Allied dock at Hartford has incorporated new ideas for wharf coat and terminal design to overcome delay and speed up unloading time.

Pumping equipment has been installed at the dock designed to handle in excess of 5,000 bbl. an hour. Theoretically the pumps could provide capacity of 120,000 bbl. each 24 hours, although allowing time for mooring barges and hookups, actual capacity is somewhat less.

Pointing to further solution of oil-transportation problems is the announcement by Petroleum Administration for War that The Texas Co.'s 34-mile, 6-in. petroleum products pipe line from Lockport, Ill., to East Chicago, Ind., should be placed in service this month.

# Move Made to Ease Tire-Worker Shortage

WASHINGTON. — Government agencies have taken additional steps to solve the increasingly critical shortage of heavy-duty bus and truck tires as well as other production crises arising at a time when, as War Mobilization Director James M. Byrnes said, "we have the enemy on the ropes; he is dazed and his knees are buckling. This is no time to take a holiday . . . it is time to finish the job."

Attacking the manpower shortage in tire plants and at the same time calling for a 30 per cent increase in output of heavy-duty tires for August and September, War Production Board announced that priority is being given to recruitment of workers for heavy-tire plants second only to a few highly secret projects, thus placing tire production ahead of aircraft.

The Army, Maj. Gen. Lucius D. Clay, director of material, ASF, said, will furlough back to tire manufacturers all soldiers over 30 years old, still in the country, not in the infantry, and who have had at least a year's experience as heavy-tire builders and banbury-room workers in the tire industry. Industry executives estimate that about 500 such men have already been released, and the total available is only about 1,000, compared with a reported shortage of between 4,500 and 6,000 tire workers.

A new manpower directive, issued August 4 by Office of War Mobilization, is also aimed at providing the essential men to meet production quotas in tires. The Byrnes directive orders Manpower Priorities Committees in all Group 1 and 2 labor areas to put employment ceilings on war industries, forcing better utilization of existing labor. Ceilings will also be placed on less essential industries to make available labor for the shortage areas, and manpower priorities will be established.

# DEATHS

**Raymond Glass,** 39, independent oil operator, died August 1 in Duncan, Okla. Glass inherited from his father 80 acres of land in the heart of the Empire oil field and became an active producer.

**Fred M. Leslie,** 72, formerly an oil-well drilling contractor, but in recent years a foreman at the plant of Emlenton Refining Co., died July 26 in Emlenton, Pa.

**Henry J. Buser,** 65, oil man and banker, died August 2 in Wichita, Kans., where he had resided 34 years.

**Capt. John M. Silva,** formerly employed in the engineering and refining divisions of Cities Service Oil Co., Bartlesville, Okla., was killed in action March 11 on the China front, according to word received by relatives. He was a member of the Engineers Corps, Air Force Command.

**I. E. Silkwood,** 61, oil-well drilling contractor, died July 30 in Wichita Falls, Tex.

**J. Simon Fluor, Sr.,** 77, founder and chairman of the board of Flour Corp., Los Angeles, died July 29 in Santa Ana, Calif.

**Pierre L. Lacombe,** 54, assistant vice president of Tide Water Associated Oil Co., died recently in San Francisco. He had been with Associated 26 years, starting as a special accountant. He served later as income tax accountant, auditor, and manager of the finance division.

**Albert V. Graham,** 64, who died recently on his ranch near Stoneham, Colo., spent most of his life in the oil business. He was a member of McCandless Drilling Co., in Oil City, Pa., until 1921, when he became field superintendent for Union Oil & Gas Co. at Chatham, Ontario. Later he was a district superintendent for Standard Oil Co. of Indiana, leaving that position last November upon buying his Stoneham ranch.

**Lt. Robert W. Searle,** 23, son of Robert A. Searle, Tulsa, of Sun Oil Co., was wounded in the Battle of Cherbourg July 8 and died the same day. Lieutenant Searle went overseas in April 1944 with the Seventy-ninth infantry division.

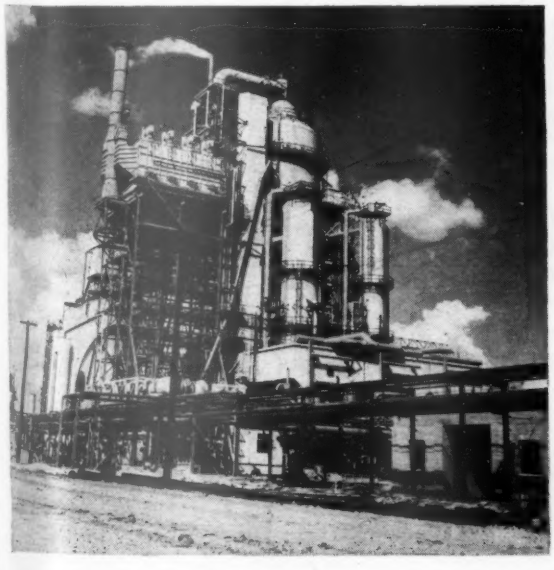
# New Plant Combines Refining, Natural Gasoline and Pressure Maintenance

**This 100-octane aviation-fuel refinery is designed and built especially to correlate with producing operations of light and heavy crudes, natural gas and with pressure maintenance in that same field. It is built close to the two operations of field production and pressure maintenance, and near the third operation for recovery of light products, natural gasoline and liquefied petroleum gases. These four operations are combined in a very unique manner, the designers believe, for materially improving the operation of each phase of the system.**

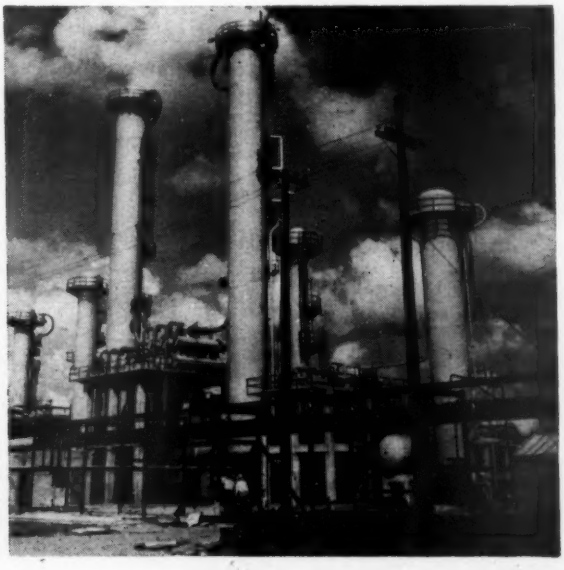
AMONG the special conditions which make the 100-octane aviation-fuel refinery by Abercrombie & Harrison Refining Corp. at Sweeny, near Freeport, Tex., an unusual combination of operations and facilities, three are outstanding. The first is that the combined operation includes that of production of crude and its accompanying hydrocarbon gases, from Old Ocean field, nearby; recovery of natural gasoline, with butanes, pentanes, and heavier for use in refinery operations proper; return of stripped (lean) gases to pressure-maintenance operation in the field mentioned; relaying of hydrocarbons above propane to the refinery, splitting the mixture and using the individual hydrocarbons as outlined later herein; secondly the refining consisting of catalytic cracking of the gas oil from the crude produced; isomerization and alkylation of isomers and olefins to form blending components for aviation superfuels, along with other products now much in the position of byproducts, and finally adjacent dock facilities for barges and tankers.

It was this intercorrelation of the five main steps—production, hydrocarbon recovery, pressure maintenance and refining, and water shipment of products—which prompted the management of this company to utilize the principle which governed the design of this plant; that is, design and installation of units and processes specifically fitted to handle the light hydrocarbons brought into the refinery, equipment and processes built for light hydrocarbons, as well as high-gravity crudes and not predominantly for handling of heavy stocks, as the typical oil refinery is designed. To do this, therefore, this refinery is designed specially to handle not only the conventional, comparatively heavy stocks from the crude as such but provision is made to process the light materials introduced in equipment under conditions most suitable for that type of charge stock, rather than attempt to handle the light materials in equipment designed for relatively heavy stocks.

In the manufacture of 100-octane aviation superfuels a large proportion of the raw material is light hy-



*Fluid catalytic cracking unit*



*Alkylation unit towers*

drocarbons. Alkylate comes from olefins $C_3$s, or isobutane, butenes and amylenes. Isopentane is segregated by superfractionation and used directly as a blending agent of high volatility and octane number, high lead susceptibility. In catalytic cracking for a high-octane-number base stock rich in isoparaffins and aromatics as required by our present aviation fuel, large quantities of olefins and isoparaffins are formed. Isoparaffins are formed by isomerization of $C_4$ and $C_5$ charge stocks from refinery or from natural or casinghead gases. Therefore design of a plant specially to get the best yields of the best products from these raw stocks is a requisite to the most efficient operation, say the planners of this refinery.

### High Yield of Aviation Fuel

As a result of this method of calculation of the advantages of a refinery of this type, the operators of this plant state that 40 bbl. of 100-octane aviation fuel are produced from each 100 bbl. of crude charged. This yield is claimed to be considerably higher than that obtained in any plant which does not take advantage of the utilization of the light hydrocarbons obtainable from natural and casinghead gases, and which does not have high-gravity crudes available. In addition a maximum recovery of natural-gasoline components is obtained, and fractions of these hydrocarbons are utilized and converted to aviation and motor fuels which otherwise might be used only as bottled gas, plant fuel, or for pressure maintenance. In addition to the above, maximum practicable advantage is taken of the stripped gases in maintaining pressure on the producing Old Ocean field, with the well-known lengthening of life of the field.

The natural-gasoline recovery plant operated and owned by J. S. Abercrombie Co. and Magnolia Petroleum Co. intermediate between the producing field and the refinery, makes about 2,600 bbl. per day of natural gasoline and special fractions, inclusive of isobutane for the alkylation unit; isopentane as direct blending agent for the 100-octane fuel, and later on will segregate normal butane for the isomerization unit at the refinery. The capacity of this natural-gasoline recovery unit is being increased considerably in order to put the entire assembly of plants into better balance. Part of the plan to do this is shown in the accompanying diagram (Fig. 1). In high-pressure absorption systems (1,200 p.s.i. and higher), it is necessary to employ high-initial-boiling point oils to avoid excessive losses of absorption oil. These oils are less efficient in absorption than low-initial-boiling-point oils. Therefore, to obtain in great measure the advantages of each property the absorption system is used as shown, with the low-boiling-point oils admitted to the absorption tower at an intermediate point, and continuing downward in the conventional manner. To strip the partly stripped gases above the inlet point of the light oil, a higher-boiling-point oil is admitted at the tower top, percolates downward and mingles with the lighter oil at the admission point of the latter, both fractions emerging as rich oil. This operation necessitates the "topping" of a fraction of the recovered lean oil continuously, the light overhead blending with the light oil for the first or lower stage of absorption and the higher-boiling-point oil going to the second stage of absorption as trim oil. The method, built into this plant by J. F. Pritchard Co., is known as the High-Pressure Trim Oil System.

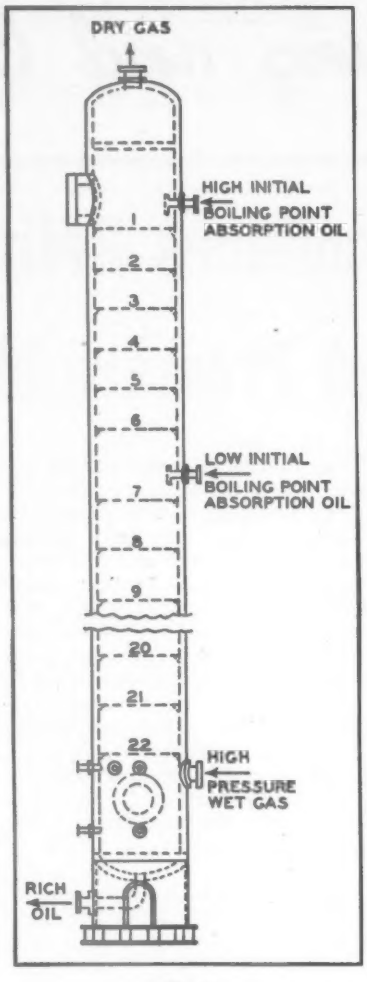



*Fig. 1*

### Refinery Equipment

The refinery proper is made up of the fluid catalytic-cracking unit, comprising a first stage or cracking reactor and a second or retreat unit, an arrangement whereby the first-pass cracked distillate may be retreated catalytically to make finished aviation base stock; an AHF (anhydrous hydrofluoric acid) alkylation unit; an aluminum chloride-+HCl isomerization unit; thermal reforming unit; crude topping unit and vacuum residue reducing unit; feed preparation unit, and other auxiliary items such as three Reilly boilers, each, of 250,000 lb. of steam per hour. The project includes an ocean-loading terminal connected to the refinery by finished product pipe lines, and barge loading and unloading facilities on the San Bernard River connecting with the Intercoastal Canal. All units except the crude unit were designed and licensed by Universal Oil Products Co. The crude unit was designed by J. F. Pritchard Co., and the entire plant was built by that company. The total cost of the entire system is about $30,000,000, exclusive of the cost of addition to the natural-gasoline unit.

The gas and crude gathering systems are essentially conventional in the Old Ocean field. A wet-gas line

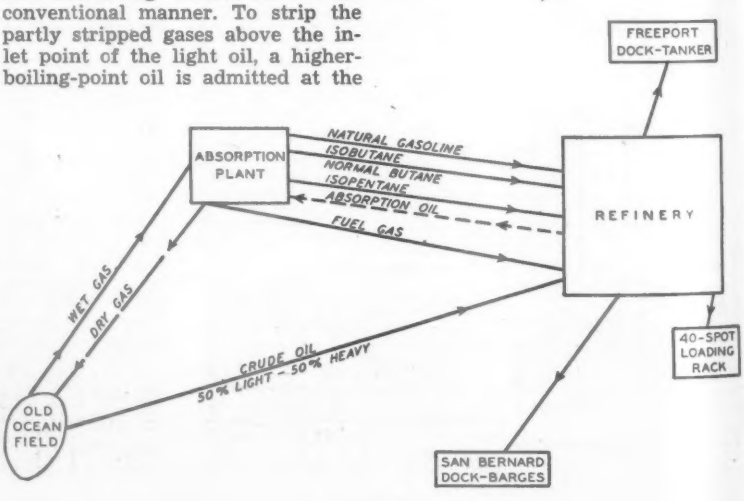
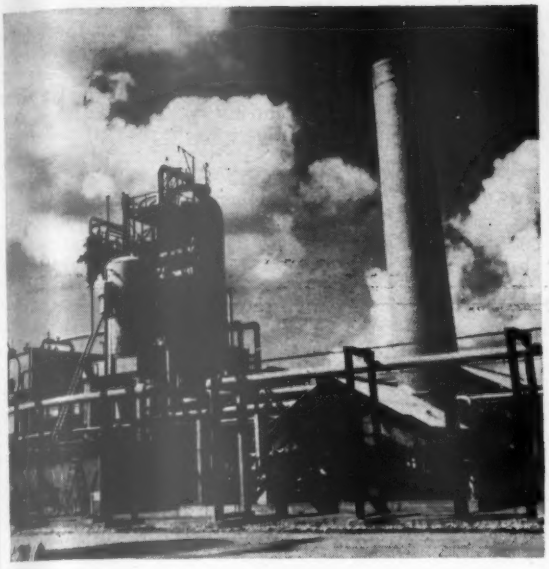



*Fig. 2*



*Crude topping unit*

*Two-furnace thermal cracking unit*

extends to the absorption plant, and dry gas is returned to the field by another line. A branch of this dry-gas line may be used to send dry gas to the refinery for fuel. Between the absorption plant are three main pipe lines. Through one, natural gasoline may be sent to the refinery as required. A second line carries isobutane from the superfractionation column at the absorption unit to the alkylation unit and may be used to carry normal butane to the isomerization unit. A third line will carry isopentane as a finished blending agent for aviation fuel.

Directly from the field two types of crude are sent to the refinery. A "light crude" of about 52-54 gravity is drawn from the central area of the field and constitutes about 50 per cent of the Old Ocean field crude production. A heavy crude, obtained mainly from the flanks of the producing field, is black in character, mixed base, and makes up the remaining 50 per cent of the refinery's crude supply. Outside crude also may enter into this supply, at the rate of 6,000-8,000 bbl. per day, to make 18,000-20,000 bbl. per day total charge, until Old Ocean production can be increased to meet the entire refinery requirements.

From this charge, some 8,500 bbl. per day, average, of straightrun gasoline or naphtha is obtained, 7,000 bbl. of which is charged to the thermal unit for reforming to give a butane-butylene (B-B) cut, 80-octane-number all-purpose motor fuel, and heavy bottoms which goes to Bunker C fuel oil. (Fig. 3). A fraction called "91-octane aviation stock" is cut out of the gasoline fraction and sent directly to blending storage as a 91-grade aviation gasoline, later blended into 100-octane-number aviation fuel. Residue from the first or atmospheric topping unit is passed to the vacuum reducing unit from which a heavy gas oil overhead cut is taken and blended with the lighter gas oil cut taken from the first or atmospheric tower and charged to the catalytic cracking unit to the extent of about 12,000 to 14,000 bbl. per day, average. The bottoms from this vacuum reducing unit go di-

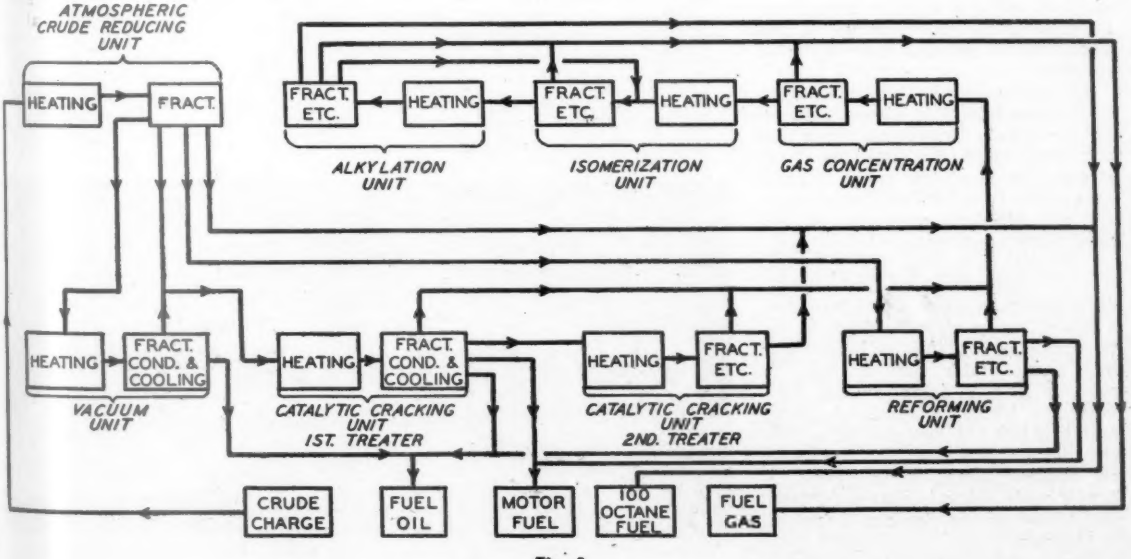



*Fig. 3*

*Forty-spot car-loading rack*

rectly to heavy fuel oil.

The combined gas oil streams are charged to the fluid catalytic cracking unit, cracked, and the overhead cracked distillate is fractionated into two cuts. Overhead is first-run base stock for aviation, the bottoms cut or heavy catalytically cracked naphtha is run to motor fuel. The first-run cracked distillate overhead fraction is retreated or cracked in a second run through the catalyst unit through a second reactor to form finished aviation-fuel base stock. Roughly 3,000 bbl. per day of finished base stock is so produced by the plant.

### Large B-B Cut

The catalytic cracking operation also produces a large B-B cut, rich in olefins and in isobutane, exact figures on which are not available at present. This fraction is combined with the similar cut from the thermal reformer. These combined streams are sent to the HF alkylation unit, and pass through the catalyst reaction chambers to form alkylate. Recycle of isobutane is controlled to maintain the isobutane-butylene ratio as high as is required to prevent polymerization of the olefin which defeats the alkylation reaction.

This alkylate is blended with the isopentane from Old Ocean field recovery plant, isopentane from the catalytic cracked distillate light straightrun naphtha, with aviation base stock from the catalytic crackers, and with any other fraction desired such as cumene, etc., to make up the plant's production of 100-octane-number aviation fuel. Secondary products of the plant include a heavy motor naphtha high in octane number which may be blended into plant motor fuel or may be sold as a high-octane-rating, low-volatility blending agent. Approximately 2,000 bbl. per day of a light recycle oil, meeting No. 2 furnace oil specifications, is produced. A heavy cycle stock is also segregated and added to the Bunker C fuel oil production.

Summarizing, the crude is topped to remove naphtha which is split into light, high-octane-number straightrun naphtha for blending, and into heavy naphtha which is reformed to make cracked distillate for motor fuel, and a large B-B cut for olefins, paraffins and isoparaffins for use especially in the alkylation step. A light gas oil is taken off the topper, and the residual oil bottoms from this atmospheric pressure step is passed to a vacuum still where it is reduced under 27-in.-29-in. vacuum to give a heavy gas oil and very heavy bottoms for heavy fuel oil. The two gas oil cuts are mixed and cracked catalytically, and the cracked distillate is split to retreat the light fraction to make finished aviation base stock, and the heavy cracked naphtha is blended into motor fuel. Two cycle oils are made from the catalytic cracker, one a light fraction meeting No. 2 furnace oil specifications and a heavy fraction which is blended into heavy fuel oil or for other fuel-oil purposes. Olefinic and isoparaffinic vapors are processed into alkylate by the HF process. When it is completed, the isomerization unit will convert normal butane into isobutane for use in alkylation. The normal butane and pentane will be obtained both from refinery gases and from casinghead or natural gas and gasoline, which are brought into the refinery from the closely correlated absorption plant operating on gases from Old Ocean field nearby, which supplies the refinery with natural gasoline, butanes and pentanes, especially isopentane.

Because of the relatively short time during which the plant has been operating full tilt, specifications, yields, etc., of various products and intermediate products are not included here. It will require probably several months more, after the isomerization unit is complete and operating before dependable and representative results can be determined satisfactorily.

The main points of advantage in the situation of the refinery have been outlined above. The intercombination between producing field with crude and wet gas, absorption plant for hydrocarbon recovery, natural gasoline and normal and isoparaffins, and a modern refinery utilizing alkylation, isomerization, catalytic cracking, superfractionation, the use of stripped hydrocarbon gases in maintaining pressure on the producing stratum of a large oil field which supplies the main body of crude for the refinery to operate on—these are the various units in the cycle of operations mutually intersupporting, and each offering practical possibilities for greater utilization of the products of each. Whether or not this system of intercorrelation will become widespread in use, postwar, remains to be seen, but the principle certainly appears to offer interesting possibilities for the intelligent operator in any of these fields where the different operations are carried out within economic limits geographically. Many important indications point to the much greater and more efficient use of light hydrocarbons, both in maintaining producing horizon pressures and as raw materials for the synthesis of motor and aviation fuels, synthetic chemicals and industrial and/or commercial products without end, in the future. Bringing these light materials into the refinery appears to be one major step in the direction of their more economic, efficient utilization in a practical way.

*View of main office building*

# Unit Compressors as Boosters on Low-Pressure Gas Wells

*by Frank B. Taylor*

**This article describes how one company is coping with the problem posed by continual reduction of natural gas rock pressure in the Panhandle to less than half its original amount. The company is resorting to the practice of building unit compressors between the weak well and its connection to the lateral. The installations have proven so satisfactory that additional ones are contemplated.**

CONTINUAL production of natural gas in the Texas Panhandle areas has gradually reduced the original rock pressure of around 450 p.s.i. to as low as 200 lb. in restricted sectors subjected to heavy withdrawals. This has posed a serious problem in gas production, as many wells are incapable of feeding into gathering systems because their rock pressures are less than the operating pressures of laterals. The problem is rendered progressively more acute through the continuing decline of rock pressure and while currently there are relatively few wells that cannot be produced against line pressures, an increase in the number of "weak" wells is a certainty that must be anticipated. The question is not only one of obtaining an adequate volume to take care of demands but production must be equitable in relation to openflow and developed acreage.

The demand of all carriers, also, has increased within the past few years and particularly since the start of the war as the natural gas is being used more and more to supplement less available fuels. It is anticipated that this demand will not soon decline and if anything it will increase as a result of the use of natural gas as a stock from which a vastly expanded array of products can be economically recovered.

There are three logical answers to the question of low-pressure wells. The first of these is to locate a main line station near the field in order that its suction reduce the lateral line pressures to such a level that the weak wells will feed by their own energy. A second solution is to construct a miniature version of the main-line booster plant on the laterals themselves not only to reduce the pressures of feeders but to increase the normal flow into the main systems. The third solution is to set an individual power plant and compressor between the weak well and its connection to the lateral.

A majority of the natural gas carriers have already been obliged to construct major compressor plants in or immediately adjacent to the gas-producing areas so this effort toward solution has been already adopted. Lateral construction of plants has been widely considered. One has been built and is now operating. The third method, that of building unit compressor installations has been resorted to by Panhandle Eastern Pipe Line Co. at the Bivins 1-91, Carson County. The installation has proven highly satisfactory mechanically, and is proving to be entirely practical economically. Other weak production of the firm has been similarly and effectively handled and additional installations are contemplated.

Disposition of gas wells has much to do with the final determination of the type of booster plant to be used, and whether or not the location is to be on a feeder or lateral. Every case is an individual problem that must be solved both from the engineering and economic standpoints. If wells are in a localized sector in which the rock pressures are within the same general range, the logical solution is a lateral-line installation. However, where wells are segregated and surrounded by high pressures, the individual installation is the economic answer.

Bivins 1-91 falls in the latter category. The well has a rock pressure of 269 lb., but is connected into a lateral that must necessarily be operated in excess of this pressure, or at about 300 p.s.i.g.

*Interior view of unit compressor showing a portion of the power to the left, with both power and compressor mounted on the same frame. The castor-oil lubricator is partially hidden although the V-belt drive is visible between the uprights. The compressor is at the left center*

### Installation

The compressor-power unit is skid mounted for convenience in handling. The power end is a multicylinder, internal-combustion type unit using natural gas from the line as fuel. This is adjusted to feed at a pressure of 8 in. of water by regulator control.

The unit is water cooled with the radiator mounted directly to the motor in the manner of the automotive power plant. In order to provide the necessary air circulation in the steel building in which the entire unit is installed, a large opening has been cut in the wall facing the radiator. In addition to serving

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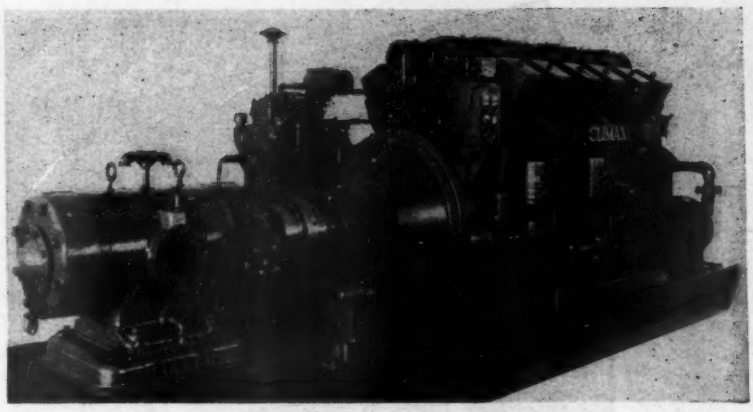
the engine, this opening may be utilized as a port for removal of the unit for overhaul merely by taking off the protective wire screen covering the opening. Intake air is exhausted through other protected openings, smaller than that facing the radiator, and cut in either side of the structure. The engine is equipped with generator, battery and a self-starter. During warm months the unit is checked each 24 hours, but in winter 48-hour inspection is sufficient. Experience has shown that the power requires about ½ to 1 gal. of water each 24 hours, with the higher demand prevailing during hottest weather. Frequent general inspections are made but it has been found that overhaul is required not more than once each 6 months.



*Shop picture of a unit compressor of the type installed at several low-pressure gas wells in the Panhandle, enabling producers to make delivery into lateral field lines despite differentials of force*

### Compressor Analysis

The compressor itself is of the rotary, multivane type. Intake and discharge openings are located in the horizontal plant on opposite sides of the cylinder, in this manner avoiding reversal of the gas flow. This allows simplification of piping and permits access to rotating parts. The absence of valves or other parts requiring frequent attention, adapts these units particularly well to continuous service. The steel rotor is arranged eccentrically within the cylinder on the same vertical center line, and the shaft is supported on radial roller bearings in each of the heads. The compression blades are of composition and are arranged to slide freely within milled slots in the rotor, the blades being forced outward during rotation solely by the effect of centrifugal force.

The eccentric mounting of the rotor within the cylinder forms a free space, crescent shaped in cross-section, divided into compartments by the blades. The volumes of these compartments vary from minimum to maximum on the intake or suction-half revolution and from maximum to minimum on the remaining, or compression-half, revolution. The large number of compartments afforded by the multiplicity of blades maintains high efficiency and reduces wear by minimizing pressure difference between adjacent compartments.

Lubrication is by force feed to all parts within the cylinder. A film of oil is formed on the cylinder wall to provide running surface for the blades. They are beveled on the leading edge to an angle sufficient to maintain this film at all positions. The compressors are designed for internal-combustion-engine speeds as well as motor speeds and are normally direct connected to the power end of the unit through a flexible coupling.

This type of compression equipment is suitable for discharge pressures up to 500 p.s.i. with a maximum differential of 100 lb. between suction and discharge. Lighter units have been developed for less severe demands in volume and pressure.

Usually the higher pressure equipment is operated at 100 lb. differential, and at a compression ratio which develops relatively low temperatures so that the machine can be operated by air cooling. The unit can be operated at compression temperatures of 180° F. without difficulties.

Under certain operating circumstances it is desirable to maintain constant suction pressures on these machines in order to prevent excessive withdrawals of gas from certain wells. In this event the unit can be equipped with a bypass expander pocket with automatic control which will maintain constant suction pressure. This unloading design utilizes an expansion pocket built into the suction lip of the compressor and makes use of the bypassed gas through recompression, thus eliminating any cooling of the bypassed gas and also recovering a certain amount of horsepower.

The compressor is mounted on the same 10-in. channel iron frame which supports the power end. The unit operates at 1,500 r.p.m. Lubrication of the compressor is by castor oil in a mechanical unit. Petroleum cylinder oil has been tried but was less satisfactory than the vegetable derivitive. Lubrication of the compressor demands approximately ½ gal. per 24 hours of operation.

The shaft driving the compressor is connected with a slip-on type universal joint, permitting removal of either of the skid-mounted units independently of the other. The drive into the compressor is packed off in the customary manner but a vent

*A small metal house protects the engine and compressor used to boost on low rock pressure wells. The large opening in the left of the building is faced by the engine radiator. The vent in the roof is from the packing gland on the compressor drive. Gas well head is at right*

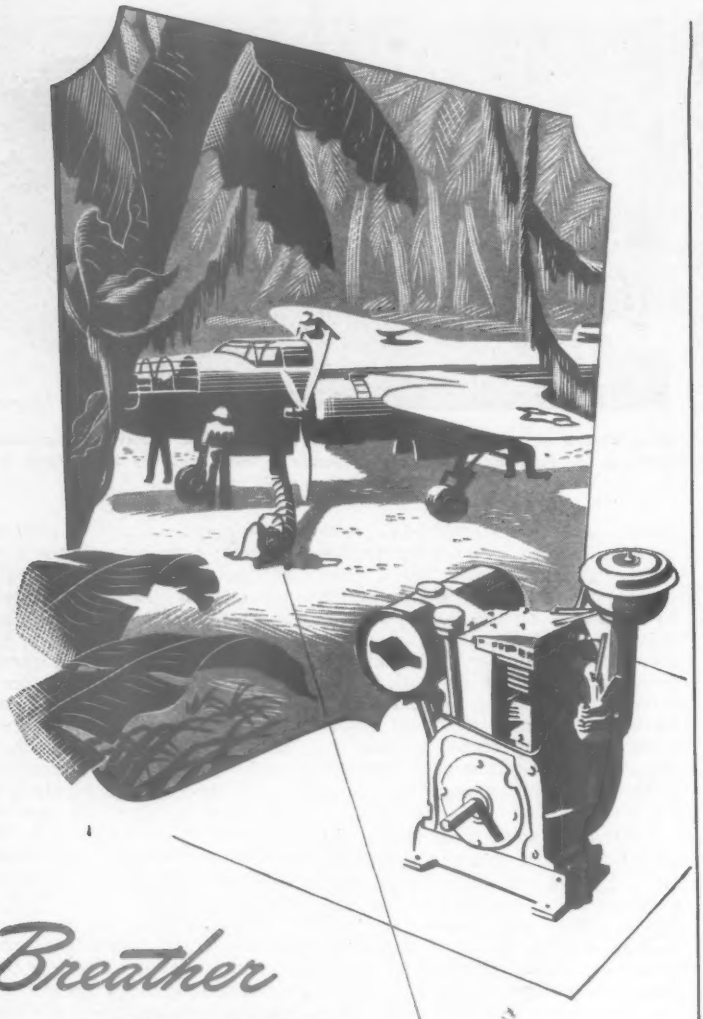
through the roof of the building exhausts any gas that may escape through the packing.

The feeder connecting this well to the adjacent lateral was originally of 4-in. line pipe. This has been left in place and the unitized compressor mounted in series with the line near the well head. Suction and discharge connections to the compressor are from 4-in. risers, swedged down to 1½ in. at compressor connections. Two drips, mounted at the compressor on the suction and discharge lines, trap sediment and moisture. In the case of this particular well, the suction drip is invariably dry, but on other wells making a little water, it would be a requisite. The discharge drip catches a small amount of lubricant.

**TABLE 1—OPERATING RECORD OF TWO UNITS**

| | Hours operated—Unit 1 | Hours operated—Unit 2 |
|---|---|---|
| 1942 | 6,217 | 6,943 |
| 1943 | 6,357 | 3,031 |
| Total | 12,574 | 9,974 |
| **Volumes of Gas Compressed (M.c.f. at 30-in. Hg. sat.)** | | |
| 1942 | 296,712 | 171,831 |
| 1943 | 286,946 | 75,616 |
| Total | 583,658 | 247,447 |
| Per 24 hours | 1,114 | 662 |
| **Operating Speed** | | |
| | 1,200-1,400 r.p.m. | 1,200-1,400 r.p.m. |
| **Lubrication—Quarts of Oil** | | |
| | Unit 1—Engine | Unit 1—Compressor |
| 1942 | 223 | 147 |
| 1943 | 172 | 148 |
| Total | 395 | 295 |
| | Unit 2—Engine | Unit 2—Compressor |
| 1942 | 311 | 129 |
| 1943 | 158 | 71 |
| Total | 469 | 200 |
| **Fuel Used—M.c.f. Gas** | | |
| 1942 | 1,818 | 1,700 |
| 1943 | 1,771 | 867 |
| Total | 3,589 | 2,567 |
| **Man-Hour Requirements*** | | |
| | Unit 1 servicing—Engine | Unit 1 servicing—Compressor |
| 1942 | 335 | 178 |
| 1943 | 408 | 354 |
| Total | 743 | 532 |
| | Unit 2 servicing—Engine | Unit 2 servicing—Compressor |
| 1942 | 291 | 232 |
| 1943 | 328 | 169 |
| Total | 619 | 401 |

*This category is operational inspection rather than maintenance of the two units that have been placed in service.

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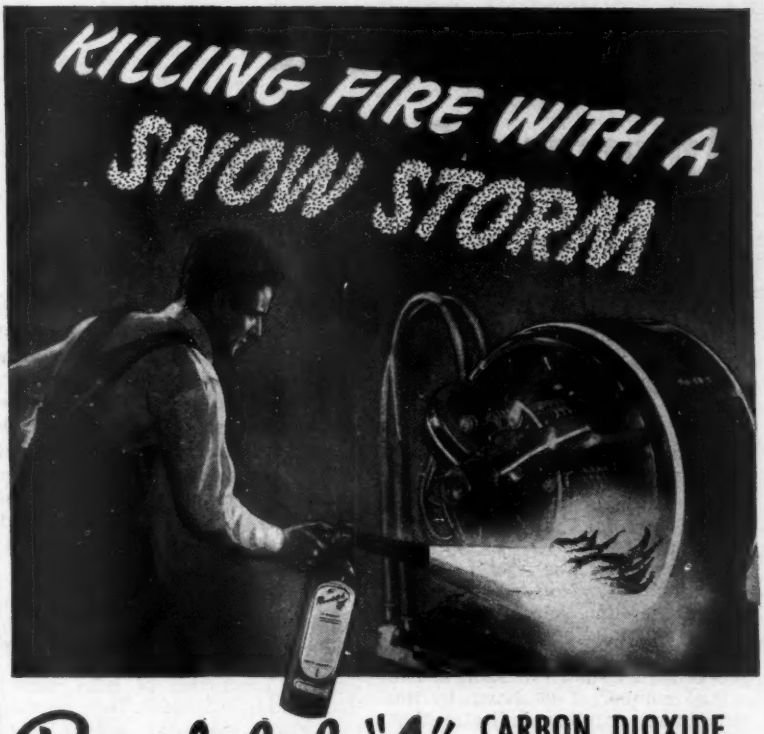
An analysis of the operation of this and another unit is shown in Table 1.

On another location handling gas from a well having a somewhat lower rock pressure, a similar installation handled 600,000 cu. ft. daily without difficulty although demanding somewhat higher horsepower to buck a differential pressure as high as 110 p.s.i. The ability of this type of unit to handle weak wells and the volumes demanded without creating a serious maintenance problem is an economic and practical answer to diminishing pressures in some areas of the field. Their flexibility and low cost makes them adaptable to varied conditions.

**Robert L. Gray** has been promoted to marine superintendent for Ashland Oil & Refining Co., Ashland, Ky. He is in charge of river transportation operations including the personnel of boats, barges and the river repair terminal in Catlettsburg, Ky. **Kenneth Nicholson** has been made marine maintenance superintendent in charge of repair work on all marine equipment and will act as Gray's assistant. Both Gray and Nicholson will work directly under the transportation manager, **M. C. Dupree.**

**Irvin W. Sanders,** sales engineer for Shamrock Oil & Gas Corp. was promoted recently to lieutenant, senior grade, U. S. Navy. He is stationed at Baltimore, Md.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# Cracking of Latin American Crude Oils

*by Gustav Egloff**

**Intensive cracking of Colon crude residuum produced 50 per cent yields of gasoline, of relatively low sulfur and 69-octane number. Cracking Colon distillate gave 53-60 per cent gasoline, with 70-octane number and 0.13 per cent sulfur. Reforming the straightrun gasoline gave 83-87 per cent yields, with very low sulfur and 68-69-octane number for the treated product.**

## 3—COLON (VENEZUELA)

THE Colon oil field includes the producing areas of Tarra, Los Manueles, El Cubo, and Las Cruces, which are about 65 miles southwest of Lake Maracaibo. In 1941 the wells of Tarra and Las Manueles fields yielded 6,649,123 bbl. of petroleum, which was a little less than 3 per cent of the total Venezuelan production for that year.[1]

The crude oil was fractionated in a continuous semicommercial still to recover gasoline, kerosene, gas oil, and residuum. The yields of fractions obtained and some of their properties are shown in Table 2. The octane number of 46 shown by the straightrun gasoline indicates that it is paraffinic, this being further supported by the characterization factor of 12.1. The doctor test was negative and the sulfur content 0.03 per cent. The kerosene fraction satisfied the requirements of a good illuminating oil in its closed cup flash point of 110° F. and its thermoviscosity of 450 seconds at 60° F. The cetane number of 60 exhibited by the gas oil fraction when tested by the delay method, corresponds to that of a good diesel fuel.

### Cracking Colon Residuum

The commercial residuum was cracked in a two-coil pilot plant, using recycle operation, to produce 375° F. end-point gasoline and a light and heavy fuel-oil residuum. In both runs a temperature of 890° F. was maintained at the exit of the heavy-oil coil, and 950° F. at the exit of the light-oil coil. Pressures of 140 lb. per sq. in. were held at the exit of the heavy-oil coil and 300 lb. per sq. in. at the outlet of the light-oil coil. Charging rates were varied in the two runs to modify the intensity of the cracking. The yields of gasoline, residuum, coke, and gas are shown in Table 3. Relatively mild cracking produced 35 per cent gasoline, and more intensive cracking 50 per cent. The properties of the residuum from each of the runs are shown in Table 4. The octane numbers of the gasolines were around 70 and were limited by the paraffinic character of the charge, higher values being obtainable by the use of cracking conditions favoring the production of coke rather than a liquid residuum. Both residua had Furol viscosities higher than the 300 second upper limit of the No. 6 oil specification, although the lighter residuum is readily cut back to a viscosity within these specifications by blending with a small amount of gas oil or intermediate boiling range cracked distillate. This cut-back fuel oil separates suspended materials so that the requirements of not over 2 per cent water and sediment is met.

A representative sample of the cracked gasoline from the light residuum run was treated with sulfuric acid at the rate of 2 lb. of acid per barrel, neutralized with caustic soda after separation of the acid, rerun with fire and steam with a maximum still temperature of 350° F., and finally sweetened by treatment with 2 per cent by volume of 16° B. sodium plumbite solution. The treating losses and yields are

**TABLE 1—PROPERTIES OF COLON CRUDE OIL**

| | |
|---|---|
| Gravity, °A.P.I. | 31.4 |
| Sulfur, % | 0.89 |
| Cold test, °F. | Below 0 |
| B.s. and w., % | 0.4 |
| 100 ml. distillation: | |
| I.b.p., °F. | 150 |
| 10% | 282 |
| 50% | 654 |
| 80% | 712 |
| E.b.p. | 716 |
| Distilled over, % | 93.5 |
| Coke by weight, % | 6.5 |
| Distilled at 400° F., % (gasoline) | 22.0 |

**TABLE 2—PROPERTIES OF GASOLINE, KEROSENE, GAS OIL AND RESIDUUM (Semicommercial Distillation)**

| Fraction— | Gasoline | Kerosene | Gas oil | Residuum |
|---|---|---|---|---|
| Yield, Vol. % | 22.2 | 13.6 | 21.9 | 42.1 |
| Gravity, °A.P.I. | 58.8 | 41.9 | 32.8 | 18.7 |
| Octane No. (A.S.T.M.) | 46 | ... | ... | ... |
| Flash temperatures, Tag, closed cup, °F. | ... | 110 | ... | ... |
| Viscosities: | | | | |
| Thermovis. at 60° F. | ... | 450 | ... | ... |
| Furol at 122° F., sec. | ... | ... | ... | 230 |
| Color, °Saybolt | 30 | ... | ... | ... |
| Doctor test | Neg. | ... | ... | ... |
| Sulfur, % | 0.03 | 0.15 | 0.75 | 1.57 |
| Cold test, °F. | ... | ... | 55 | 45 |
| I.b.p. | 134 | 310 | 524 | 478 |
| E.b.p. | 398 | 542 | 750 | ... |
| Characterization factor | 12.1 | 11.8 | 12.0 | 11.8 |
| Cetane No. | ... | ... | 60 | ... |

**TABLE 3—CRACKING YIELDS**

| | 1 | 2 |
|---|---|---|
| Yields—Vol. % of charging stock: | | |
| Gasoline | 35.1 | 49.8 |
| Residuum | 58.2 | 35.0 |
| Liquid recovery | 93.3 | 84.8 |
| Yields—weight % of charging stock: | | |
| Gasoline | 27.0 | 38.9 |
| Residuum | 61.6 | 40.0 |
| Coke | 6.5 | 6.5 |
| Gas | 9.4 | 15.8 |
| Gas, cu. ft./bbl. of charging stock | 368 | 618 |

**TABLE 4—PROPERTIES OF CRACKED RESIDUUMS**

| | 1 | 2 |
|---|---|---|
| Gravity, °A.P.I. | 10.9 | 1.1 |
| Viscosity, Furol at 122° F., sec. | 357 | 3,600 |
| B.s. and w., % | 7.1 | 6.5 |
| Flash (Cleveland open cup), °F. | 285 | .... |
| Fire (Cleveland open cup), °F. | 340 | .... |
| Flash (Pensky-Martens), °F. | 175 | .... |
| Cold test, °F. | 65 | .... |
| I.b.p., °F. | 450 | .... |
| Distilled at 572° F., % | 4.0 | .... |

**TABLE 5—TREATMENT OF CRACKED GASOLINE**

| | |
|---|---|
| Acid, lb./bbl. | 2 |
| Sodium plumbite, (16° Be.), % | 2 |
| Treating losses: | |
| Acid solution loss, % | 0.7 |
| Polymerization loss, % | 0.4 |
| Distillation loss, % | 0.0 |
| Total loss, % | 1.1 |
| Yields: | |
| Finished cracked gasoline, % raw gasoline | 98.9 |
| Raw gasoline, % charging stock | 39.7 |
| Finished cracked gasoline, % charging stock | 39.3 |

*Director of Research, Universal Oil Products Co.

[1]O'Donnell, J. P., The Oil and Gas Journal, 40, 44, 34 (1942).

**TABLE 6—PROPERTIES OF UNTREATED AND TREATED CRACKED GASOLINES**

| | Untreated | Sweetened | Acid treated and sweetened |
|---|---|---|---|
| Acid, lb./bbl. | None | None | 2 |
| Sodium plumbite, % of 30° Be. | None | 3 | 3 |
| Gravity, °A.P.I. | 61.2 | 61.2 | 62.2 |
| Color, °Saybolt | 17 | 20 | 29 |
| Color stability* | ... | ... | 24 |
| Corrosion, copper strip | Pos. | Neg. | Neg. |
| Doctor test | Pos. | Neg. | Neg. |
| Gum, mg./100 ml. (copper dish): | | | |
| Without inhibitor | 66 | 107 | 3 |
| With inhibitor No. 1 (0.025%) | .. | 45 | 3 |
| Sulfur, % | 0.13 | 0.13 | 0.09 |
| Vapor pressure (Reid), p.s.i. | 8.7 | 8.3 | 6.0 |
| Oxygen bomb stability, induction period, minutes: | | | |
| Without inhibitor | 105 | 55 | 100 |
| With inhibitor No. 1 (0.025%) | ... | 155 | 570 |
| Octane No. (A.S.T.M.) | 69 | ... | 69 |
| 100 ml. A.S.T.M. distillation: | | | |
| I.b.p., °F. | 108 | ... | 110 |
| 10% | 148 | ... | 145 |
| 50% | 238 | ... | 233 |
| 90% | 334 | ... | 320 |
| E.b.p. | 382 | ... | 370 |
| Distilled over, % | 97.0 | ... | 98.0 |
| Bottoms, % | 1.0 | ... | 1.0 |
| Loss, % | 2.0 | ... | 1.0 |

*Color °Saybolt after exposure equivalent to 2 hours noon June sunlight.

**TABLE 7—PROPERTIES OF COLON DISTILLATE**

| | |
|---|---|
| Gravity, °A.P.I. | 24.6 |
| Flash (Cleveland open cup), °F. | 350 |
| Fire (Cleveland open cup), °F. | 390 |
| Flash (Pensky-Martens), °F. | 290 |
| Viscosity, Furol at 122° F., sec. | 21 |
| Sulfur, % | 1.16 |
| Cold test, °F. | 80 |
| B.s. and w., % | 1.3 |
| Salt (sodium chloride), lb./1,000 bbl. | 3.3 |
| 100 ml. distillation: | |
| I.b.p., °F. | 536 |
| 10% | 632 |
| 50% | 680 |
| 70% | Cracking |
| E.b.p. | 750 |
| Distilled over, % | 95.0 |
| Coke, weight, % | 5.0 |
| Distilled at 572° F., % | 1.5 |

given in Table 5, and Table 6 summarizes the principal properties of the treated gasoline in comparison with the untreated material and gasoline produced by sweetening without acid treatment. The data show that a marketable motor fuel is producible by the 2 lb. acid and sweetening treatment.

### Cracking of Distillate From Colon Residue

For further testing of the suitability of Colon residue for cracking to marketable gasoline and fuel oil, the commercial residue was distilled in a semicommercial plant to produce a 65 per cent by volume overhead distillate for cracking tests. The principal properties of the distillate are given in Table 7. The material was solid at ordinary temperatures and represented a rather close cut fraction since its initial boiling point was 536° F. and it contained only 1.5 per cent of material boiling below 572° F. The distillate was cracked in a two-coil pilot plant using recycle operation to produce cracked gasolines from which 375° F. end-point marketable products could be prepared by light acid treatment. In three runs transfer temperatures of 910° and 950° F. were maintained at the exit of the heavy and light-oil coils respectively, and corresponding pressures of 150 and 350 lb. per sq. in. The intensity of cracking was increased by reducing the charging rate so that greater yields of gasolines and decreased yields of residuum resulted. The yields of gasoline residuum, and gas obtained in the three runs are shown in Table 8, and Table 9 summarizes the principal properties of the untreated gasolines and residua. The octane numbers of the three untreated gasolines were all close to 70 and the Furol viscosities of the residua increased from 68 to 270 seconds as the intensity of cracking was raised. The residua from the second and third runs had viscosities within the No. 6 A.S.T.M. fuel-oil range. The indicated b.s. and w. was waxy in character and should not affect the value of these products in fuel-oil service.

The cracked gasoline obtained in the run which produced 7.8° A.P.I. residuum was treated with a minimum amount of 93 per cent sulfuric acid to produce a marketable gasoline. Acid was used at the rate of 1 lb. per barrel and the gasoline was then neutralized with sodium hydroxide and rerun with fire and steam without exceeding a temperature of 350° F. The treatment, treating losses, and yields are indicated in Table 10. The properties of the untreated gasoline, of the sweetened gasoline, and of the acid-treated and sweetened gasoline are shown in Table 11. The treatment with 1 lb. of sulfuric acid produced a marketable gasoline which required no inhibitor to reduce its copper dish gum to a point consistent with commercial requirements. The sample subjected only to doctor sweetening showed a low gum content after the addition of 0.025 per cent of No. 1 inhibitor. The octane number of 70 in the finished acid-treated gasoline was the same as that of the untreated gasoline.

### Reforming of Colon Straightrun Gasoline

The straightrun gasoline obtained

**TABLE 10—TREATMENT OF CRACKED GASOLINE**

| | |
|---|---|
| Treatment: | |
| Acid, lb./bbl. | 1 |
| Sodium plumbite, (8° Be.), % | 2 |
| Treating losses: | |
| Acid solution loss, % | 0.2 |
| Polymerization loss, % | 0.0 |
| Distillation loss, % | 0.5 |
| Total loss, % | 0.7 |
| Yields: | |
| Raw cracked gasoline, % charging stock | 58.6 |
| Treated cracked gasoline, % cracked gasoline | 99.3 |
| Treated cracked gasoline, % charging stock | 58.2 |

**TABLE 8—CRACKING YIELDS**

| Yields, Vol. % of charging stock: | 1 | 2 | 3 |
|---|---|---|---|
| Gasoline | 53.0 | 58.6 | 59.4 |
| Residuum | 37.9 | 32.8 | 31.9 |
| Total liquid recovery | 90.9 | 91.4 | 91.3 |
| Gas, cu. ft./bbl. charge | 509 | 556 | 608 |

**TABLE 9—PROPERTIES OF CRACKED RESIDUUMS**

| | 1 | 2 | 3 |
|---|---|---|---|
| Gravity, °A.P.I. | 10.6 | 7.8 | 6.1 |
| Flash (Cleveland open cup), °F. | ... | 285 | ... |
| Fire (Cleveland open cup), °F. | ... | 350 | ... |
| Flash (Pensky-Martens), °F. | ... | 140 | ... |
| Viscosity, Furol at 122° F., sec. | 68 | 128 | 270 |
| Cold test, °F. | ... | 40 | ... |
| B.s. and w., % | 4.2 | 2.8 | 4.4 |
| I.b.p., °F. | ... | 405 | ... |
| Distilled at 572 °F., % | ... | 7.5 | ... |

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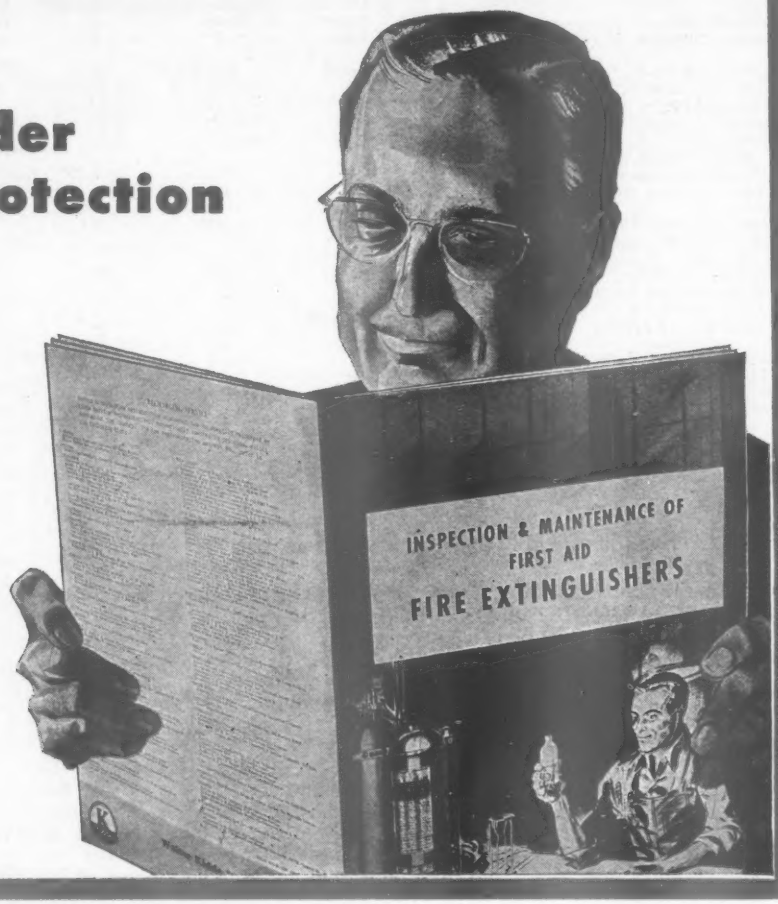


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- CARBON DIOXIDE EXTINGUISHERS
- SODA-ACID EXTINGUISHERS
- FOAM EXTINGUISHERS

**WALTER KIDDE & COMPANY, INC., 140 CEDAR STREET, NEW YORK 6, N. Y.**

**TABLE 11—PROPERTIES OF UNTREATED AND TREATED GASOLINES**

| | Untreated | Sweetened | Acid treated and sweetened |
|---|---|---|---|
| Acid, lb./bbl. | None | None | 1 |
| Gravity, °A.P.I. | 62.5 | ... | 62.4 |
| Color, °Saybolt | 4 | 14 | 26 |
| Color stability* | ... | ... | 22 |
| Corrosion, copper strip | Pos. | Neg. | Neg. |
| Doctor test | Pos. | Neg. | Neg. |
| Gum, mg./100 ml. (copper dish): | | | |
| Without inhibitor | 44 | 60 | 2 |
| With inhibitor No. 1 (0.025%) | 9 | 7 | 1 |
| Sulfur, % | 0.14 | 0.13 | 0.10 |
| Vapor pressure (Reid), p.s.i. | 11.9 | 11.2 | 7.8 |
| Oxygen bomb stability, induction period, minutes: | | | |
| Without inhibitor | 220 | 155 | 130 |
| With inhibitor No. 1 (0.025%) | 330 | 255 | 435 |
| Octane No. (A.S.T.M.) | 70 | ... | 70 |
| 100 ml. A.S.T.M. distillation: | | | |
| I.b.p., °F. | 86 | ... | 108 |
| 10% | 128 | ... | 145 |
| 50% | 234 | ... | 239 |
| 90% | 340 | ... | 327 |
| E.b.p. | 400 | ... | 373 |
| Distilled over, % | 97.0 | ... | 97.0 |
| Bottoms, % | 1.0 | ... | 1.0 |
| Loss, % | 2.0 | ... | 2.0 |

*Color, °Saybolt after exposure equivalent to 2 hours noon June sunlight.

**TABLE 12—REFORMING YIELDS**

| | | |
|---|---|---|
| Yields, vol. % charging stock: | | |
| Gasoline | 86.8 | 82.8 |
| Residuum | 1.4 | 1.3 |
| Liquid volume loss | 11.8 | 15.9 |
| Gas, cu. ft./bbl. charging stock | 388 | 484 |

**TABLE 13—PROPERTIES OF UNTREATED REFORMED GASOLINE, AND RESIDUUM**

| | | |
|---|---|---|
| Untreated gasoline: | | |
| Gravity, °A.P.I. | 60.0 | 60.1 |
| Vapor press., (Reid), p.s.i. | 10.9 | 9.0 |
| Octane No. (A.S.T.M.) | 64 | 69 |
| 100 ml. distillation: | | |
| I.b.p., °F. | 108 | 99 |
| 10% | 150 | 148 |
| 50% | 253 | 244 |
| 90% | 343 | 350 |
| E.b.p. | 386 | 400 |
| Distilled over, % | 98.0 | 95.0 |
| Bottoms, % | 1.0 | 1.0 |
| Loss, % | 1.0 | 4.0 |
| Residuum: | | |
| Gravity, °A.P.I. | 30.1 | 29.4 |
| 100 ml. distillation: | | |
| I.b.p., °F. | 371 | 292 |
| 10% | 398 | 365 |
| 50% | 435 | 435 |
| 90% | 671 | 650 |
| E.b.p. | 701 | 690 |
| Distilled over, % | 98.0 | 97.0 |
| Bottoms and coke, % | 2.0 | 3.0 |
| Distilled at 400° F., % | 13.5 | 27.0 |
| Distilled at 572° F., % | 84.5+ | 81.0 |

in the semicommercial distillation of Colon crude oil was reformed in a pilot plant at high temperatures and pressures. Operations were conducted so that all cracking and reforming reactions took place in the heating coil, quenching being employed in the transfer line to arrest the reactions. The properties of the gasoline are given in Table 2 which shows that the straightrun gasoline fraction, obtained in a yield of 22.2 per cent, had a gravity of 58.8 A.P.I. and and A.S.T.M. octane number of 46.

Two runs were made at 1,000° F. and 500 and 750 lb. per sq. in. respectively, to produce reformed gasolines of different octane ratings. The yields obtained in the two runs are shown in Table 12. The lower yield of reformed gasoline was obtained at the higher pressure. The principal properties of the untreated reformed gasolines are shown in Table 13, and indicate that products having A.S.T.M. octane numbers of 64 and 69 were produced in yields of 86.8 and 82.8 volume per cent of the reforming charge respectively. The residual material from the two runs contained 13.5 and 27 per cent respectively of 400° F. end-point material.

**TABLE 14—TREATMENT OF REFORMED GASOLINE**

| Treatment | Acid | Acid |
|---|---|---|
| Acid, lb./bbl. | 1 | 2 |
| Treating losses: | | |
| Acid solution loss, % | 0.5 | 1.1 |
| Polymerization loss, % | 0.0 | 0.5 |
| Distillation loss, % | 0.5 | 0.2 |
| Total loss, % | 1.0 | 1.8 |
| Yields: | | |
| Reformed gasoline, % of charging stock | 82.8 | 82.8 |
| Treated reformed gasoline, % of reformed gasoline | 99.0 | 98.2 |
| Treated reformed gasoline, % of charging stock | 82.0 | 81.4 |

The 69 - octane - number reformed gasoline was treated with 1 lb. and with 2 lb. of 93 per cent sulfuric acid per barrel, neutralized and redistilled using both fire and steam. The treating data and yields are shown in Tables 14 and 15.

**Clyde Thomas** has resigned as legal counsel for District 5, Petroleum Administration for War, to return to private law practice in Los Angeles. He was one of the original members of the District 5 executive staff, organized just before the Japanese attack on Pearl Harbor. He is a graduate of the University of Southern California Law School and a veteran of the first World War, in which he served overseas as a member of the Air Corps.

**A. H. Lloyd** is now head landman for the Sinclair Prairie Oil Co. and Sinclair Wyoming Oil Co. organization in Evansville, Ind. He replaces **John E. Watson,** who resigned to join the British American Oil Producing Co. staff.

**James Walton** is the new scout for Superior Oil Co. in Midland, Tex. He succeeds **Ray L. McCoy,** who was transferred to the company's Oklahoma City office.

**A. L. Burch,** assistant production superintendent for The Ohio Oil Co. in Tulsa, has gone to Findlay, Ohio, company headquarters, to organize an eastern Maryland division.

**TABLE 15—PROPERTIES OF UNTREATED AND TREATED REFORMED GASOLINE**

| Treatment | None | 1 lb. acid | 2 lb. acid |
|---|---|---|---|
| Gravity, °A.P.I. | 60.1 | 59.9 | 59.6 |
| Color, °Saybolt | 13 | 25 | 30 |
| Color stability* | ... | 21 | 26 |
| Doctor test | Neg. | Neg. | Neg. |
| Gum, mg./100 ml. (copper dish): | | | |
| Without inhibitor | 10 | 1 | 0 |
| With inhibtor No. 1 (0.025%) | 2 | 2 | 1 |
| Sulfur, % | 0.03 | 0.01 | 0.01 |
| Vapor pressure (Reid), p.s.i. | 9.0 | 9.0 | ... |
| Oxygen bomb stability induction period, min.: | | | |
| Without inhibitor | 265 | 275 | 730 |
| With inhibitor No. 1 (0.025%) | 490 | 1,000 | 1,000 |
| Octane No. (A.S.T.M.) | 69 | 68 | 67 |
| 100 ml. distillation: | | | |
| I.b.p., °F. | 99 | 102 | 100 |
| 10% | 148 | 143 | 146 |
| 50% | 244 | 244 | 244 |
| 90% | 350 | 344 | 340 |
| E.b.p. | 400 | 380 | 380 |
| Distilled over, % | 95.0 | 97.0 | 98.0 |
| Bottoms, % | 1.0 | 1.0 | 1.0 |
| Loss, % | 4.0 | 2.0 | 1.0 |

*Color, °Saybolt after exposure equivalent to 2 hours noon June sunlight.



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*Then he said to himself*

# "A War Measure of First-Class Magnitude"

WHEN the standing of India was occupying the attention of Washington, Mohandas Karamchand Gandhi wrote to the India League of America:

> "I want you to look upon the immediate recognition of India's independence as a war measure of first-class magnitude."

For a man so definitely non-Hollywood in dress or words "FIRST-CLASS MAGNITUDE" amounts to a cataclysmic pronunciamento.

Again it shows that one who is fired by a great idea automatically adds emphasis to enthusiasm! And *that* is an important business measure.

You saw it well illustrated when war conversion was hurled at manufacturers . . . and when "impossible" schedules were handed them.

Men were far from enthusiastic. Remember?

But viewed in the light of subsequent experience, those quotas for air, land and sea weapons today seem modest. All because aroused men quickly found out first-hand what Arc Welding could do. And when it did the job well, they became enthusiastic . . . which brings triumph to any front.

# Paraffin Problem in Panhandle Overcome By Water, Steam and Pressure

**Paraffin constitutes one of the chief production problems in the Texas Panhandle. Special measures to combat its deposition or effect its removal from wells are being developed. These vary widely in their adaptation to individual conditions. Unusually effective results have been realized from steaming operations adopted by Phillips Petroleum Co.**

SINCE the opening of production in the Texas Panhandle, paraffin in the crude has been a major producing problem. While it is found throughout the field, it is neither uniform in distribution nor constant at a particular location. In addition to the general problem of paraffin, salt and gyp deposits on tubing and rods add to the complexity of counter measures and increases operating costs proportionally.

Primary measures to combat the situation have varied with the development of the field and such means as producing against backpressure, acid, heat and mechanical scrapers have been used effectively. These methods have been gradually changed and varied to meet conditions apparently dictated by individual cases, and are successful in the over-all picture.

The practice of steaming wells, which has been used effectively in most areas, has also undergone improvement in application. Added measures are part of the paraffin-control method as used by Phillips Petroleum Co. on a majority of its leases. While the method varies to suit local conditions, the plan is generally adaptable to any producing well in which paraffin, salt or gyp is a deterrent to operation.

### Equipment

Some 400 producing oil wells in the dolomite area are equipped for steam treatment of crude paraffin, the same general plan applying to all. A regular 125-lb. lease boiler is used to supply the steam, and each well is connected to the boiler by 2-in. lines. A blowoff is placed near each well in the line from the boiler with a valve on each side of the blowoff for control both ways.

The steam line is connected at the well head as in operation the steam is injected into the annulus. Lead lines are laid normally with a valve-controlled blowdown near the well to check the pumped fluid during steaming.

In practice on an average well that is not "salting" up severely, boiler pressure is built up to between 40 and 125 lb., depending upon past experience on that particular lease or well. Production is normally continued unless the well has been allowed to go the extreme and must be pulled. Steam is injected into the annulus under boiler pressure with the volume controlled by the steam-line valve.

Most wells are equipped with a 7-in. oil string; less frequently with 5½-in. Two-inch tubing is used. The average producing depth is 3,100 ft. with the fluid level varying from 150 to a general maximum of 700 ft. The steam at normal-injection pressure depresses the fluid column in the annulus a distance equivalent to the pressure plus the weight of water either carried by or condensed from the steam. In this way the treatment is intensified in the area of maximum paraffin formation, which is customarily near the top of the fluid column in the annulus and somewhat higher in the tubing.

Water is added to the steam. Practice is to produce a flushing action as much as possible through the addition of considerable volumes of water to the steam. Between 50 and 75 bbl. of water are pulled through the boiler during a normal treatment of from 2 to 3 hours. This has been found far more effective than dry steam.

### Process

The water and steam in the annulus, plus the heat, flushes the face of the pay and breaks down the formation of paraffin. With the well still on the pump, the fluid is produced through the lead line into the lease tanks where it is treated in the normal manner. The fact that the method actually cleans the face of the dolomite or lime is substantiated by increased production obtained from some wells in which it was known the tubing and pumping equipment were free of paraffin.

In order to aid the effectiveness of the method, the lead line is frequently closed at the blowdown for short periods of time with the pressure build-up watched by means of a gage temporarily connected into a riser on the lead line between the control valve and the well head. Pressure against the well may be allowed to go to 300-700 lb. The lead-line control is then opened, producing a purging action that dumps the tubing at a velocity of fluid flow greatly in excess of normal. This action tends to disrupt paraffin cake

*Steam is released for a visual check to determine the amount of water carried. The boiler acts as much as a hot-water tank as it does as a steam generator as the treatment requires up to 75 bbl. of water per well*



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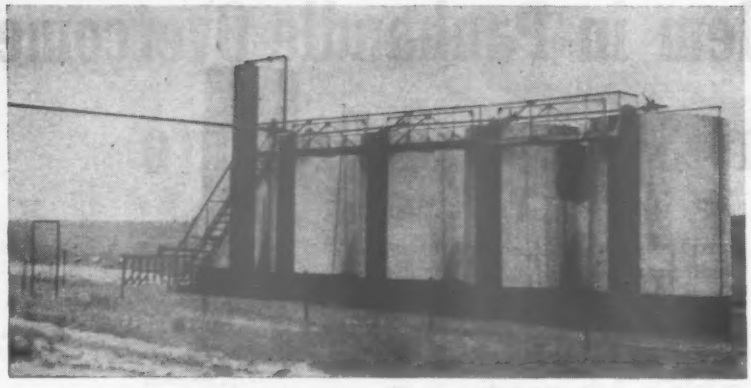

*Fluid produced from the well, containing freed paraffin and sludge, is normally treated out in the lease tanks*

within the tubing and on the rods, and spreads the temperature influence higher in the well. Holding and releasing back pressure is done intermittently as dictated by the action of the well.

Familiarity with a particular lease allows the pumper to accurately judge the condition of a well merely by noting the action of the pumping power, its apparent drag, and comparing this with the interval during which the well has been produced without requiring attention. This interval changes with sustained production, becoming greater in some areas and shorter in others.

The cleaning process can be gaged by the same means, with the added facility of discharging some of the produced fluid from the lead line for examination. In some cases as much as 4 or 5 bbl. of paraffin may be discharged by a single treatment. At times this is in the form of dispersed sludge in the crude, while at other times it is ejected in adhesive ropes that resembles rubber hose.

### Salt

Much trouble has developed in the dolomite areas with salt forming on both tubing and rods. The crustation is dense and in addition to creating a special problem, provides a surface from which paraffin readily builds. This salt deposit does not break down as readily as does the paraffin, and practice has shown that cold water, rather than hot, is a practical dissolving agent. The water is introduced in the annulus when the well can be pumped down, or directly in the tubing.

Greatest concentration of salt formation seems to be near the top of fluid column. There is no accurate way of checking the quantity of salt released through cold-water treatment for it is in solution when brought to the surface.

Purging action has little effect upon the salt deposits. Back pressure operation tends to reduce deposition, most likely by holding the salt in solution owing to the additional pressure exerted against the fluid column. The same principle inhibits the separation of paraffin from the produced crude.

### Application of Pressure

Another practice that is being applied to paraffin wells to good advantage is the application of pressure during the down period on individual wells. Instead of merely closing in the well or shutting off the power, the gate on the lead line is closed and the well is allowed to build up a tubing lead-line pressure of between 300 and 700 lb.

During the static period the well fluid releases some paraffin that adheres to tubing and rods, but most of this is flowed into the lead line when the pressure of the well is released preparatory to resuming production. In this way a preventative measure against static accumulation of paraffin is possible.

There is the added advantage in the use of back pressure in retarding separation of paraffin from crude. Separation is roughly proportional to decreased pressure of the fluid. The greater the pressure the more paraffin the crude oil will normally retain in solution, effectively reducing deposition.

Preventative control of paraffin and salt deposition not only is necessary to keep many of the wells producing, but provides decreased operating costs by reducing the load on the lifting equipment. None of the described methods have indicated any detrimental influence on pumping equipment. Treatment of wells before they have had time to become a cleanout problem represents a considerable saving in well maintenance.

The methods being used are simple, and are applied by the lease pumper in most cases. The frequency varies with the well and location, but the time element is usually from 2 to 3 weeks. The practice of steam treatment is inexpensive both as to time and equipment, and when combined with cold water and sustained pressure on shut-in wells, has proven highly effective in all but exceptional cases.

**H. R. Straight,** president of Cities Service Oil Co., finds himself memorialized in the name of a new town which has sprung up in the Guymon area of Texas County, Oklahoma. Straight already has about 50 residents. A brick schoolhouse is being built, and it is planned to make the town a model community. Cities Service Gas Co. promoted development of the Guymon gas area and constructed a natural gas pipe-line system.

*A gage in the lead line indicates the pressure held against the well while steam in injected between the tubing and the oil string. Immediately to the right of the gage is the blowdown on the steam line from the boiler*

# The Spectrometric Analysis of Gases

*by L. J. Brady**

**Rapid and accurate evaluation of multicomponent gases and mixtures is becoming increasingly important in petroleum refining operations and its related manufacture of chemicals. This paper explains advanced studies in the field of spectrometric analysis. It was presented before a joint production and chemical committee conference of the technical division, American Gas Association, and is a contribution of the Koppers Co. fellowship at Mellon Institute.**

THE demands upon the petroleum and chemical industries for large amounts of aviation gasoline, synthetic rubber and other vital materials have led these fields to adopt newer, faster methods of analysis. In particular, infra-red and ultra-violet spectroscopic procedures have proved to be exceptionally useful, owing in large part to the speed of analysis, the fact that "on stream" determinations can be made, and the ready adaptation of spectroscopic appliances to automatic control of reaction and processing equipment.

Both ultra-violet and infra-red spectroscopy are based on the well-known phenomena that the absorption spectrum of a molecule is unique, and that with few exceptions admixture with other compounds does not affect this property. As a result, the concentration of any component in a mixture can be determined spectroscopically, provided it has at least one absorption band at a wave-length where the other components are relatively transparent.

After correcting for false energy and the use of slits having finite widths, the absorption measurement made on the routine ultra-violet and infra-red spectrometers the familiar Beer's law,

$$I = I_o e^{-(k\lambda cx)},$$

where $I_o$ is the energy incident on the sample, I is the energy transmitted by the sample, k is the aborption coefficient at wave-length $\lambda$,c is the concentration, and x is the length of the absorption cell. This expression can be put in the alternate form,

$$\log_{10} \frac{1}{T} = \epsilon cx = D,$$

where T is the transmission factor, $\epsilon$ is the extinction coefficient, and D is the optical density. For monochromatic radiation the optical density of a mixture equals the sum of the optical densities of the components, that is, at any wave-length $\lambda$,

$$D = d_1 + d_2 + d_3 + \ldots\ldots + d_n,$$

where D is the optical density of the mixture and $d_n$ is the optical density of the n'th component. In general, in such equations, one for each of n selected spectral positions, are required to determine the concentration of each component present.

Absorption spectrometry in the ultra violet is being used as a rapid, versatile method for the identification and quantitative determination of substances having one or more conjugated double bonds. Paraffins and mono-olefins do not exhibit characteristic absorption much above 200 mu; consequently, they cannot be studied with routine ultra-violet spectrometers. This property makes it possible to determine the concentration of diolefins and aromatics in gases containing, in addition to these materials, paraffinic and mono-olefinic constituents. The concentration of each aromatic and

FIGURE 1.
Ultraviolet Absorption Curves for Benzene and Toluene

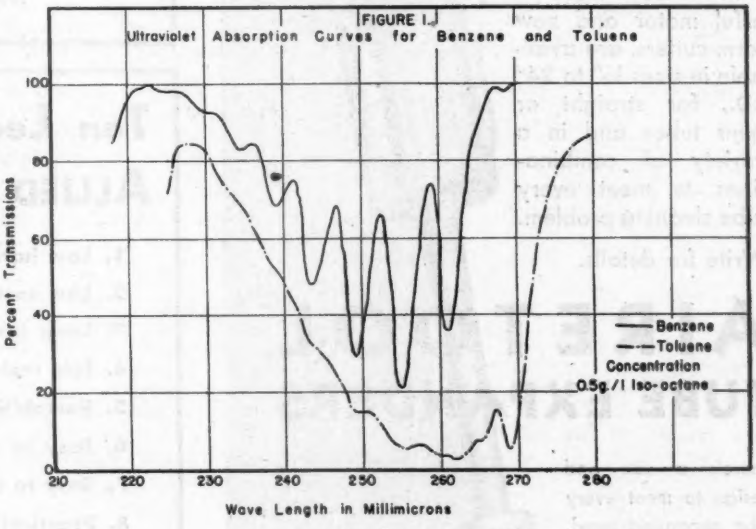


*Fig. 1*

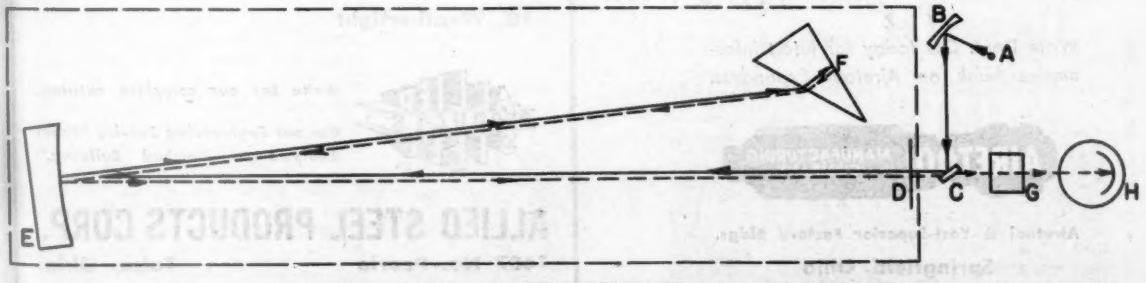


*Fig. 2—Schematic diagram of Beckman Model DV quartz spectrophotometer*

*Industrial Fellow, Mellon Institute, Pittsburgh, Pa.



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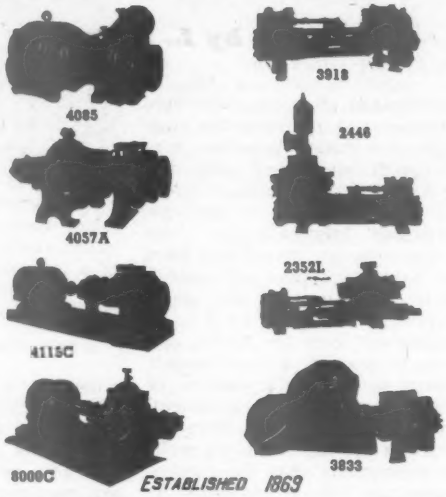


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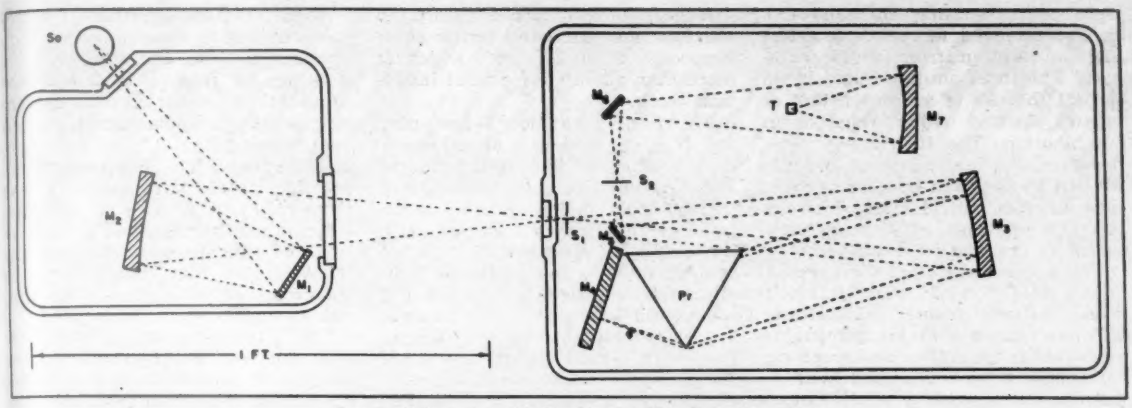



*Fig. 3—Schematic optical path of infrared spectrometer*

diolefin present in gases containing relatively few of such constituents can also be ascertained in many cases.

Typical absorption curves for benzene and toluene are reproduced in Fig. 1. These curves were obtained with a Beckman model DU quartz spectrophotometer, an instrument designed to operate from 220 mu in the ultra-violet to well over 1,000 mu in the near-infra-red, which can be used to analyze both liquids and gases. The monochromator is a modification of a mirror-collimated Littrow spectrograph capable of giving the desired performance with a minimum of optical and mechanical parts. The reflecting prism avoids the necessity of using left and right-hand quartzes and doubles the dispersion. The use of a mirror as a collimator renders unnecessary the employment of achromatic lens or the focusing complications required with simple quartz lenses.

Two interchangeable light sources are used. For the spectral range 320 to 1,000 millimicrons, a standard 32-candlepower automobile headlight is utilized. In the spectral range 350 to 220 mu, a hot cathode hydrogen discharge tube is used. The complete optical system is shown in Fig. 2.

An image of the light source located at (A) is focused with five-fold magnification by condensing mirror (B) and diagonal mirror (C) on the plane of the slits at (D). At (D) the entrance slit is located directly below the exit slit. Both slits are curved, are of the bilateral type, and have a working height of 13 mm. The collimator (E) is a spherical mirror of 50 cm. focal length, approximately 5 cm. wide and 9 cm. high, and is operated about 5° off axis. The spherical aberration and astigmatism introduced by using such a spherical collimator in the ultra violet is insignificant. The prism (F) has a 30° angle and is made of the best quartz. The back surface, which is aluminized, has a diameter of 5 cm. (G) is a quartz absorption cell placed between the exit slit at (D) and the phototube at (H). The photo-tube current is measured by balancing the voltage drop across a 2,000-megohm resistor with a slide-wire potentiometer. Several circuit features are included to avoid photo-tube dark current corrections and arithmetical calculations of the percentage transmission and optical density. The instrument is compact, rugged, simple to operate, and gives excellent service.

### Spectrometers on Market

Two routine infra-red spectrometers are now on the market. The Beckman instrument was designed to handle gases only, but is being modified so that liquids can be analyzed as well. The instrument manufactured by the Perkins-Elmer Corp. of Glenbrook, Conn., is more versatile, having been designed to analyze liquids, gases, and solids. The schematic diagram of this instrument is shown in Fig. 3. Infra-red radiation from a Globar source ($S_o$) is reflected by the plane mirror ($M_1$) and collimated by the spherical mirror ($M_2$) onto the entrance slit ($S_1$). The radiation from ($S_1$) is rendered parallel by an optically precise, off-axis parabolic mirror ($M_3$), refracted by the prism (Pr), and reflected by the Littrow mirror ($M_4$) back through the prism to ($M_5$). The exit radiation beam is reflected by the mirror ($M_6$) to the exit slits ($S_2$). The emergent beam from ($S_2$) is reflected by ($M_6$) to ($M_7$), where it is focused on the thermocouple (T). The effective aperture of the spectrometor is f:4.5, and its focal length is 27 cm. The use of a 60° 75 by 60 mm. NaCl prism permits work through the spectral range from 1 to 15 microns. The completely housed spectrometer measures 31 in. by 11-in. base by 8-in. height. The optical path is almost entirely enclosed by two air-

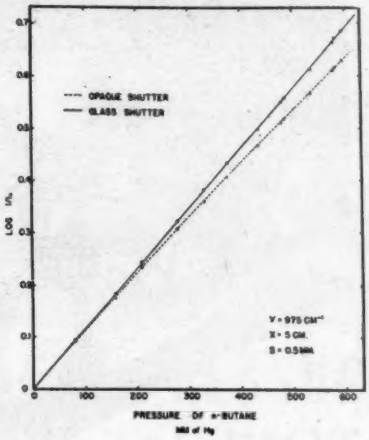



*Fig. 5—Beer's law plot for n-butane at 975 CM⁻¹*

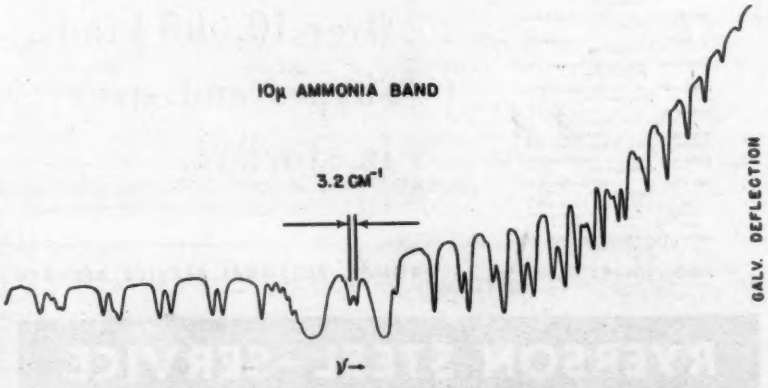



*Fig. 4—Ten-micron $NH_3$ absorption band*

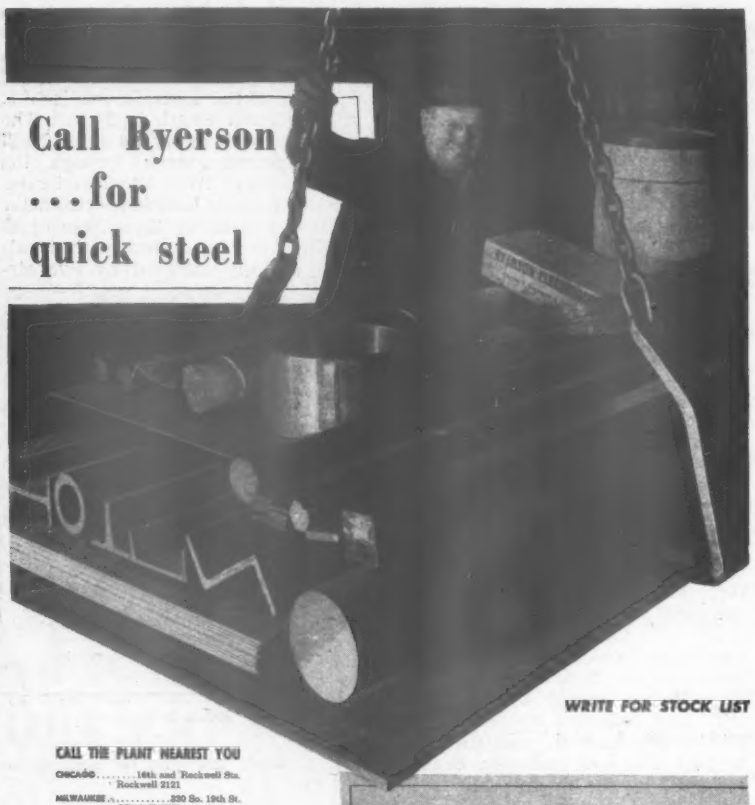
tight covers so that $H_2O$ and $CO_2$ can be removed to reduce interference absorption from these materials. The three shutter flags shown permit the use of various filters or crystal shutters either alone or in combination. The instrument is so designed that liquids, gases, and solids can be analyzed by placing samples in the optical path between the two housings. Absorption cells up to 10 cm. can be employed.

Fig. 4 shows the absorption record of the 10 micron $NH_3$ band obtained with this spectrometer (slit widths 0.15 mm.) using a double galvanometer amplifying system and scanning continuously by turning the Littrow mirror control with a small motor. The very closely spaced absorption maxima near the band center show a resolution of 2.3 $cm^{-1}$, which is more than adequate for most industrial work.

Fig. 5 gives a Beer's law plot, log I/Ie vs. pressure of n-butane, in a 5 cm. cell. The dotted line of Fig. 5 is not straight; its curvature increases at higher pressures because of the effect of scattered light. By using a glass instead of an opaque shutter, the scattered light effect is eliminated, so that the experimental points lie on a straight line as revealed by the solid graph. The very slight point scattering demonstrates the potential accuracy of infra-red analysis.

With infra-red spectrometers, dry gases having as many as seven components can be analyzed with an accuracy of from 1 to 2 per cent of the total. Minor impurities cannot usually be determined in concentrations below 0.1 per cent with any accuracy. The instruments are not fool-proof, but operators who have had 1 or 2 years of technical training can be taught in a relatively short time to operate them and to evaluate the data. Servicing should never be attempted by routine operators.

The ultra-violet spectrometer does not lend itself readily to the analysis of multicomponent mixtures containing more than three components, but under favorable conditions very low concentrations of impurities can be determined, either in the anhydrous state or associated with water. The precision of ultra-violet analysis is somewhat better than that associated with infra-red analysis, amounting to about 0.5 per cent. Routine work requires persons who have had 1 or 2 years' technical training, and the instrument can be serviced by routine operators.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# BOOKS

ORGANIC CHEMISTRY. By Louis F and Mary Fieser. Published by D. C Heath & Co., Boston, Mass., $8.

Inclusion of several chapters dealing with important applications of organic synthesis to technology and industrial operations especially in the biological and medical fields characterizes the new book on organic chemistry. More than 1,000 pages are divided between 40 chapters, accenting especially the natural organic products, fats and carbohydrates and giving much attention to aromatic hydrocarbons. The chapter on petroleum hydrocarbons is short and perfunctory, 27 pages, and the small amount of space devoted to non-benzenoid hydrocarbons as compared to the aromatic series indicates that the authors are more interested in the nonpetroleum fields of organic materials.

The work is presented in textbook style, with good summary attention to major synthesis such as the Grignard, nitrile, Fischer-Tropsch, Sandemeyer, Wurtz-Fittig, Beckmann and many others. Much attention is given to synthesis and properties of carbohydrates, dyes and naturally occurring organics and their processing.

1944 OIL AND PETROLEUM YEAR BOOK. Published by Walter E. Skinner, 20 Copthall Ave., London, E.C.2, price 12s.6d., net, and 13s.6d., post free abroad.

The new edition, the thirty-fifth year of issue of this standard reference work, has just been published. Complete and up-to-date particulars are given concerning 537 companies covering all branches of the oil industry. American and foreign companies are fully dealt with.

The particulars of each company comprise names of directors and other officials, seat of operations, description of business, details of capital, dividends, and financial results. Other useful features are, the names and addresses of 216 managers and engineers and the names of the companies in the book with which they are connected.

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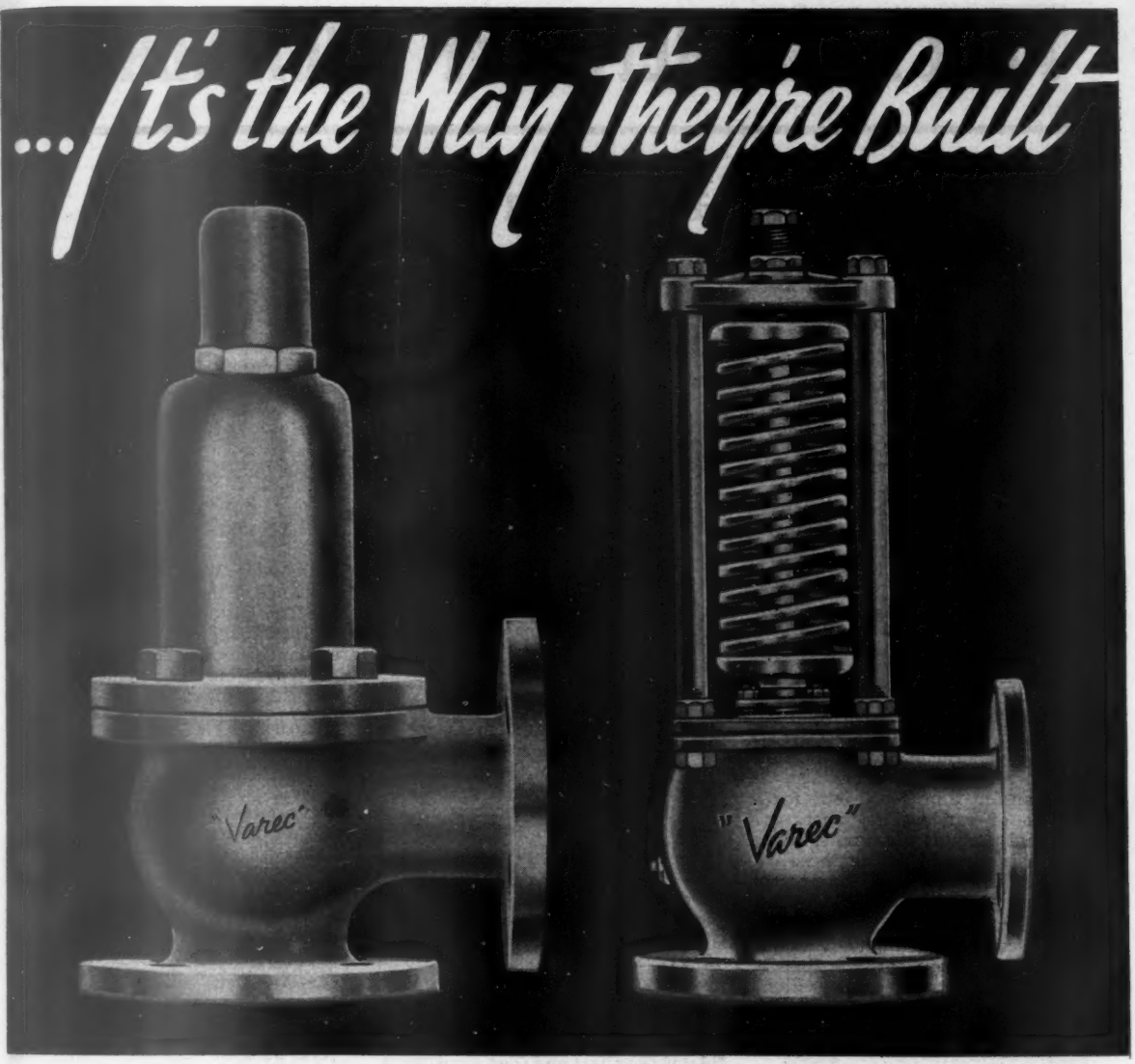


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# PRACTICAL REFINERY ENGINEERING

## No. 8—Heat Transfer Film Coefficients for Steam

*by Paul Buthod and B. W. Whiteley*

**Steam condensing with vertical tube heat interchange apparatus is discussed in this article. A chart which may be used to facilitate calculations is included, along with two practical examples which are solved in illustrating the use of the chart. Steam-pressure ranges from 4 in. abs. to 100 p.s.i. gage and pipe lengths from 1 to 1,000 in. are covered by the chart.**

### VERTICAL PIPES

HEAT-exchange systems which involve condensation of steam, are constructed with either horizontal or vertical tubes. In the calculation of the heat-transfer film coefficient on the steam side, it is necessary to distingush the difference between horizontal and vertical tubes. For steam condensing on the outside or inside of vertical tubes, the following equation derived by Nusselt is ordinarily used.

$$(1) \qquad h = 0.943 \left(\frac{k^3 \rho^2 g \lambda}{L z t_s}\right)^{0.25}$$

Although this equation applies to steam, it may be used as an approximation for other vapors, provided that the vapor consists of a single component. Factors affecting the heat-transfer film coefficient for a mixture of condensing vapors are exeedingly complex and no satisfactory basis for calculating these coefficients is available at the present time.

In the case of steam, two distinct types of condensation have been differentiated. These are ordinarily termed "film-type condensation" and "drop-wise condensation," and give entirely different values for the steam film coefficient. The foregoing equation is conservative and gives values for the steam film coefficient which can ordinarily be attained in actual practice. However, in some instances, experimental work on vertical tubes has given results 30 to 50 per cent greater than would be indicated by Equation 1.

The thermal properties of the vapor in the Nusselt equation are to be evaluated at the mean film temperature of the fluid. In order to obtain the film coefficient, it is necessary to assume a value for the temperature drop through the steam film and solve for the thermal resistance by trial-and-error methods. Since thermal resistances are proportional to the temperature drops, this fact may be utilized to check the assumed value for the temperature drop through the steam film.

The accompanying chart (Fig. 1) may be used to facilitate these calculations. The procedure to be used, is illustrated in the following examples:

**Example 1.**—Steam enters a condenser which is constructed with vertical tubes 58 in. long. The condenser pressure is 4 in. Hg absolute. The temperature drop through the steam film is estimated to be 6° F. Find the thermal resistance and film coefficient for the steam side.

**Solution.**—Entering the chart on the right-hand side at a temperature drop through the steam film of 6° F., move horizontally to a steam pressure of 4 in. absolute. At this point move vertically to a pipe length of 58 in. At this intersection move horizontally to the left side of the chart and read R=0.00086.

$$h = 1/R = 1/0.00086 = 1163$$
B.t.u./hr.-sq. ft.-°F.

**Example 2.**—Water is to be heated in a vertical, double-pipe heat exchanger which consists of 2-in. standard pipe on the inside of 3-in. standard pipe. The water is circulated through the 2-in. pipe while the steam condenses in the annulus. 20,000 lb./hr. of water is to be heated from 60° to 140° F. The steam is saturated at atmospheric pressure. The heat exchanger is to be constructed of units of pipe which are 10 ft. long. Find the required number of units.

**Solution.**—The total resistance to the flow of heat consists of the water side, tube wall, and steam film resistances. These will be calculated in the foregoing order.

(a) Water Side Resistance — The water has a mass velocity of 820,000 lb./hr.-sq. ft. (See The Oil and Gas Journal, July 1, 1944). The thermal resistance of the water side film at this mass velocity and an average water temperature of 100° F. is 0.00128. (See The Oil and Gas Journal, July 1, 1944, page 50.)

The water film resistance based on the outside surface of the 2-in. pipe is:

$$R_1 = 0.00128 \times 2.375/2.067 = 0.00147$$

(b) Metal Wall Resistance — The resistance of the metal wall is 0.0003. (See The Oil and Gas Journal, June 17, 1944, page 99). Correcting this resistance to an equivalent resistance based on the outside diameter of the 2-in pipe:

$$R_2 = 0.003 \times 2.375 \times 2/(2.076 + 2.375) = 0.000321$$

(c) Steam Film Resistance—In order to obtain the steam film resistance, it is necessary to assume a temperature drop through the steam film, calculate the resistance for this temperature drop and then check the assumed temperature drop by means of the relation:

$$t_s = \Delta t \times R_s/R_1 + R_2 + R_s)$$

This involves a trial-and-error solution.

The sum of the water side and metal wall resistance is:

$$R_1 + R_2 = 0.00147 + 0.000321 = 0.00179$$

The true mean temperature difference, which is the same as the log mean temperature difference in this case, is found to be 107° F. (See The Oil and Gas Journal, June 24, 1944, page 84).

Trial No. 1—Assume $t_s = 30°$ F.

$R_s = 0.00135$ (from chart)

Check:

$$t_s = 107 \times 0.00135/(0.00179 + 0.00135) = 46° \text{ F.}$$

The assumed value of 30° F. is therefore too low.

Trial No. 2—Assume $t_s = 50°$ F.

$R_s = 0.00157$ (from chart)

*(Continued on page 94)*

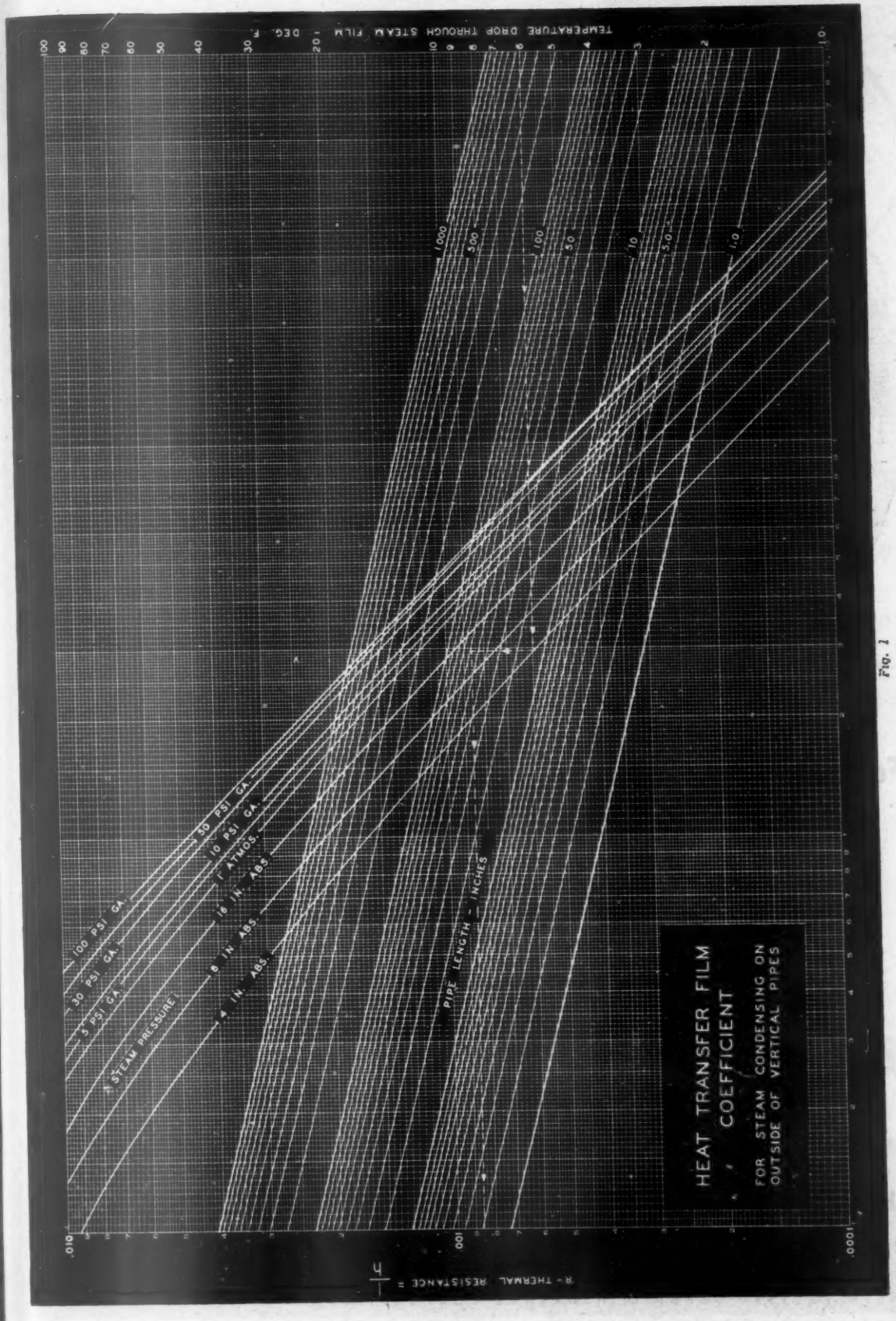


Fig. 1

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THE FIRST NATIONAL BANK AND TRUST COMPANY OF TULSA

MEMBER FEDERAL DEPOSIT INSURANCE CORPORATION

(Continued from page 92)

Check:

$t_s = 107 \times 0.00157/(0.00179+0.00157) = 50°$ F.

Since this checks the assumed value of 50° F., the steam film resistance is $R_s = 0.00157$.

The total resistance to the flow of heat is:

$0.00157 + 0.00179 = 0.00336 = R_t$

The over-all coefficient of heat transfer is:

$$U = 1/R_t = 1/0.00336 = 298 \text{ B.t.u./hr.-sq. ft.-° F.}$$

The amount of heat to be transferred is calculated from the pounds of water handled and the temperature rise.

$$q = 20{,}000 \times 1.0 \times (140 - 60) = 1{,}600{,}000 \text{ B.t.u./hr.}$$

The required area of the heat exchanger, based on the outside diameter of the 2-in. pipe is:

$$A = q/U\Delta t = 1{,}600{,}000/298 \times 107 = 50.2 \text{ sq. ft.}$$

From a table of standard pipe sizes, the length of 2-in. pipe corresponding to and outside surface of 1 sq. ft. is found to be 1.608 ft.

The required length of 2-in. pipe in the exchanger, then, is:

$$50.2 \times 1.608 = 80.6 \text{ ft.}$$

Neglecting fouling resistance, eight of the 10-ft. sections would be necessary in order to fulfill the given conditions.

Notation:

- $q$ = amount of heat transferred, B.t.u./hr.
- $A$ = area of heat exchange surface, sq. ft.
- $\Delta t$ = true mean temperature difference, °F.
- $t_s$ = temperature drop through steam film, °F.
- $U$ = over-all coefficient of heat transfer, B.t.u./hr.-sq. ft.-°F.
- $h$ = heat transfer film coefficient, B.t.u./hr.-sq. ft.-°F.
- $R_1$, $R_2$, $R_s$, etc., thermal resistance = 1/h.
- $k$ = thermal conductivity, B.t.u./hr.-ft.-°F.
- $g$ = acceleration of gravity, ft./hr. ($= 4.18 \times 10^8$)
- $z$ = viscosity of condensate, lb./ft.-hr.
- $d$ = pipe diameter, ft.
- $D$ = pipe diameter, in.
- $L$ = length of heated pipe, ft.
- $\lambda$ = latent heat of vaporization,
- $\rho$ = density of condensate, lb./cu. ft.

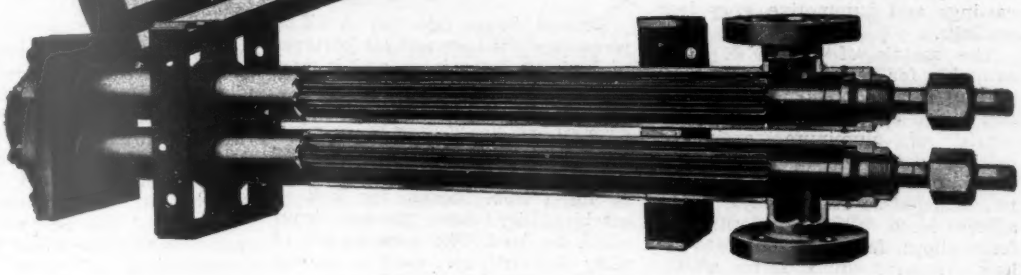
### References and Bibliography

1. Badger, W. L., and McCabe, W. L. "Elements of Chemical Engineering," McGraw-Hill Book Co., New York, 1936.
2. McAdams, W. H., "Heat Transmission," McGraw-Hill Book Co., New York, 1933.

In 1942...

# NOW OVER 40,000

## TWIN G-FIN SECTIONS



There are important reasons why Twin G-Fin Section sales increase so steadily . . . and so rapidly.

- *The design of these units is backed by 76 years of experience in building heat transfer apparatus.*
- *Their details of construction have been proved by 10 years of service.*
- *More than 800 users have found that these "universal heat exchangers" can be applied to a greater variety of heat transfer processes than any other type of apparatus on the market.*

Write for Bulletin 1613 which explains the wide preference for these units.

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**GRISCOM-RUSSELL**
**TWIN G-FIN SECTION**
*The Universal Heat Exchanger*

# PROGRESS IN METALS

*by W. L. Nelson*

## Aluminum and Magnesium Available as Substitutes

THE July 15 (No. 13) issue of the Materials Substitutions and Supply List of the War Production Board brings the encouraging news that aluminum and magnesium are now available in sufficient quantities to permit their use for essential purposes. These are the first of the important tonnage nonferrous metals that have been available since early in 1942. Likewise zinc and lead have eased slightly but not enough to slip to Group 3 (substitute metals).

The Group 1 metals, those not available in amounts needed by war and essential industries, consist of cadmium, chromium metal, sodium, tin, columbium ferro alloys, nickel ferro alloys, monel, malleable iron castings and automotive gray iron castings.

The metals of Group 3, those available for essential uses as substitutes for the metals of Groups 1 and 2, are becoming numerous and consist of aluminum, antimony, calcium, gold, magnesium, mercury, paladium, forroboron ferro alloys, ferromanganese ferro alloys, ferrosilicon ferro alloys, ferrotitanium ferro alloys, ferrotungsten ferro alloys, ferrovanadium ferro alloys, molybdenum ferro alloys, siliconmanganese ferro alloys, silvery iron ferro alloys, zirconium ferro alloys, steel forgings (except drop and upset), gray iron castings (except automotive), pig iron, steel reinforcing (all types) and rerolled rail.

Address Editor, Materials Substitutions and Supply List, Conservation Board, W.P.B., Room 2511 Tempo D Building, Washington, D. C., regarding copies of the lists or any suggestions.

## Cast Iron for High Pressure Fluids

TRADITIONALLY cast iron has been specified by engineers and designers for the handling of liquids and gases because of its cheapness and easy machinability, but it has seldom been employed for high-pressure fluids. Now that heavy-duty high-strength irons are becoming common, an increasing tendency to use gray iron for high-pressure services is evident. The new irons do not permit leakage or seepage through the metal unless extreme pressures are encountered and freedom from warping is assisting in the maintenance of tight joints or connections.

The serviceability of the improved irons is indicated by the following comparisons (E. S. Clark, Metals & Alloys, April 1944):

| Property— | Older cast irons | Modern cast iron* |
|---|---|---|
| Tensile strength, p.s.i. | 30,000-33,000 | 53,000 |
| Yield strength, p.s.i. | 24,000-26,000 | 42,400 |
| Compressive strength, p.s.i. | 120,000 | 175,000 |
| Fatigue strength, p.s.i. | Unreliable | 22,000 |
| Charpy impact, ft.-lb. | Unreliable | 7.2 |
| Modulus of elasticity, p.s.i. | †12,000,000 | 21,000,000 |
| Design strength in tension, p.s.i. | 2,000-3,000 | 8,000-10,000 |

*G.A. Mechanite. †But unreliable.

Several years ago the A.S.T.M. recognized the increasing importance of high strength irons and it now specifies seven classes of irons according to the minimum tensile strength, as No. 20 iron has a minimum strength of 20,000 p.s.i. ranging up to 60,000 p.s.i. for the No. 60 or strongest iron. Except for lack of machinability, even stronger irons could be used. The percentages of alloy elements, etc., used in various irons are somewhat as follows:

| | |
|---|---|
| Carbon (total) | 2.5 -3.6 |
| Manganese | 0.55-0.85 |
| Silicon | 1.1 -2.5 |
| Chromium | 0 -0.75 |
| Nickel | 0 -2.0 |
| Molybdenum | 0 -1.05 |
| Vanadium | 0 -0.15 |

With respect to the use of Mechanite cast irons, E. S. Clark states:

"The applications of high-duty cast iron in pressure vessels are growing in number and increasing in the severity of service successfully met, as engineers gradually learn that old-time cast iron and modern engineering quality cast iron are quite different materials. Valve bodies; valve disks; gas meters; greasing-system fittings; hydraulic cylinders for presses, die casting machines, lifts, dump trucks, compressors and pumps; diesel injection blocks; steam chests, etc., are among the pressure units of various types that have been made out of high-duty irons on a production scale."

In order to obtain a dense iron of fine grain structure that will not sweat or leak under pressure, to obtain uniformity in strength at various sections, and to avoid the distortion that causes leakage at joints, it is necessary to obtain the high-pressure castings from a foundry that is experienced in such work, chemical analysis is by no means an assurance of strength.

## Silver Clad Steel for Flouride Corrosion

AMONG the worst corrosion agents are certain chlorine, flourine and bromine compounds. Diluted hydrochloric and hydrofluoric acids or these same acids when hot (even if anhydrous) are particularly troublesome—and in fact no truly satisfactory metallic materials except silver and tantalum have been used. For many services, glass or ceramics ware are satisfactory. Obviously there are many operations in the chemical industries that involves these acids, but one of the most extensive processes is the hydrofluoric acid alkylation process used in the petroleum industry for manufacturing aviation gasoline. Nearly all of the newest 100-octane plants have employed the HF alkylation process. Petroleum chlorinated solvents are also troublesome.

The metal silver is a relatively weak and a very ductile material, and hence great thickness of metal is required in order to gain strength. The Lukens Steel Co. has assisted in the situation by fabricating silver-clad steel for the construction of hydrofluoric acid and other equipment. The cheapness and strength of the clad-steel as compared with pure silver permits the construction of large equipment where cost heretofore has been prohibitive. Silver linings also have been used but the direct bonding of silver to steel is said to be more satisfactory, particularly with respect to the conduction of heat. The Lukens company has been active for many years in the development of clad steels.

## Metallurgical Terms

**Fiber**

A fibrous or woody appearing structure found in fractures of wrought metal, and generally indicating directional properties, is called fiber.

## Metallurgical Review Service—a Correction

On this page of June 24, 1944, the A.S.T.M. was inadvertently given credit for the establishment of a new Metallurgical Literature Review Service. The American Society for Metals (A.S.M.) offers this service, not the American Society for Testing Materials (A.S.T.M.)

A FEATURE OF THE OIL AND GAS JOURNAL

# THEORY OF SQUEEZE CEMENTING

SQUEEZE cementing involves the injection of neat cement slurry under high pressure into a permeable formation, or through pipe perforations, usually for the purpose of reducing gas production or water production from an oil well. It seems appropriate first to describe some of the effects that are usually observed in connection with squeeze-cement jobs and discuss some of the theories that have been offered to explain the observed phenomena. Later, a description will be given concerning the technique and equipment used in this type of work.

Experience has proved that it is desirable to break down the resistance of a formation to passage of cement slurry by pumping water or acid into the formation ahead of the cement slurry. It has been found that the "breakdown" pressure required to start water into a formation is in many instances considerably in excess of the natural fluid pressure existing in the given formation. Once fluid enters the formation, pressure required to continue the injection usually drops noticeably, and great quantities of additional fluid can be pumped in without increase in pressure. After a steady flow of water into the formation has been established and the injection pressure has reached a minimum, the water is followed by cement.

It has been found that in general a formation has been successfully "squeezed" when after injection of some cement slurry, the pressure required to maintain flow increases back to the breakdown pressure observed for the given job. This is a fairly reliable index as to when to stop pumping cement and consider the job complete. If, after introduction of cement slurry into the formation, there is no pressure increase above that required to maintain water injection, it is an indication that the formation has relatively high permeability and that the cement will not effectively seal the formation pores as desired. Multiple batch squeeze jobs are often successful in finally producing the desired results if an effective seal is not obtained with a single batch.

Field experience with squeeze cementing indicates that water under pressure will selectively enter a gas-bearing or water-bearing zone in preference to an oil-bearing zone of the same permeability. This produces a fortunate situation because it allows the breakdown of, and injection of cement into, gas zones and water zones without appreciable damage to exposed oil-bearing zones. Observations show that many times a gas pay or water pay can be excluded without shutting off oil. In addition to the easier pathway opened for the cement slurry by the breakdown water, there are two other conditions which aid in preventing damage to the oil pay. In the first place, very little water will be squeezed out of the cement slurry into the oil pay, but water will be squeezed from the slurry adjacent to gas-bearing and water-bearing zones; and as a result the cement will not set so rapidly and firmly against the oil zone as against other parts of the exposed hole. Secondly, cement does not form a tenacious band against an oil-coated surface, but will adhere firmly to a water-coated surface.

### Factors Influencing Decline

A somewhat controversial question is in regard to just what causes a decline in input pressure following the initial breakdown pressure. The most logical explanation seems to be that the permeability of the formation is increased by the action of the breakdown fluid. If this is true, the question then arises as to what physical changes takes place in the formation to increase its permeability. There are several possible factors that may have an influence, namely:

1. Solution of soluble solids by the breakdown water.

2. Erosional action or actual movement of silty material mechanically by the passage of water through the pores.

3. Structural changes in the formation by the prying action of the high pressure which may actually lift the overburden and thus enlarge the passages through the formation.

Certain marine sands are known to contain precipitated mineral salts which may be dissolved by water used in the squeezing process. The solution of these salts would result in an increased permeability due to enlargement of the sand pores. This action would not be expected in water-bearing sands, but would likely be more effective in gas-bearing sands. Acid water instead of fresh water can be used in limestone to enlarge the pores by solution prior to the introduction of cement.

In general, breakdown pressures are found to be lower in soft, friable formations than in harder formations. Possibly, this may explain why squeeze cementing has been more successful in the younger sediments of the Gulf Coast than in the harder formations of the Mid-Continent area. It is possible that sufficiently high breakdown pressures have not been applied to disrupt the structure of the harder formations.

A squeeze-cement job is more likely to be successful if the face of the formation to be squeezed is thoroughly cleaned prior to the operation. This may be accomplished by washing the hole with water or by enlarging the hole with a wall scraper immediately before the squeezing operation.

Squeeze cementing, as now practiced, is relatively new. Even so, it is only a refinement of the old plug-back methods that were used much earlier in an effort to accomplish the same result. In the earlier processes of pressure cementing, the pressures were applied to the entire casing string, and thus were limited to the maximum internal pressure that the casing would withstand. By present methods, the limit of pressure is determined mainly by the bursting strength of drill pipe or tubing and by the maximum working pressure of the pumps. The development of a cement retainer to eliminate high pressures against the casing and the improvements in high-pressure pumping equipment are the two main factors that have contributed to the success of modern squeeze cementing.

Series prepared by Glenn M. Stearns, associate professor of petroleum engineering, University of Oklahoma

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## OVERCOMES TWO ENGINE CHARACTERISTICS THAT PREVENT MAXIMUM OIL FILTRATION EFFICIENCY

**The Briggs Patented Molded Fullers Earth Refill Cartridge**
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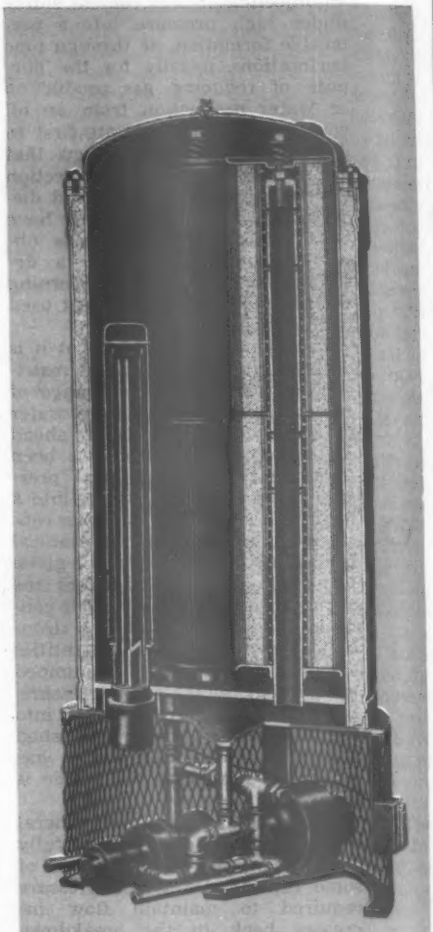
All possible safety features to prevent overheating or scorching oil have been incorporated in this Clarifier. Only the best mechanical equipment . . . pumps, motors, heater . . . are used. The complete unit is backed by Briggs guarantee of satisfactory performance.

See the Briggs representative in your territory for complete details of this and other Briggs Oil Clarifiers. Factual literature showing sizes, specifications, flow diagrams, construction details and functional information, is available through all Briggs distributors.



Cutaway of Briggs DRU Series, Automatic Recirculating Clarifier, showing dual rotary displacement pumps and motors, bayonet-type heater. Note jacket insulation to prevent heat loss.

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PIONEERS IN MODERN OIL FILTRATION

**BRIGGS CLARIFIER COMPANY**
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# The Refiner's Notebook

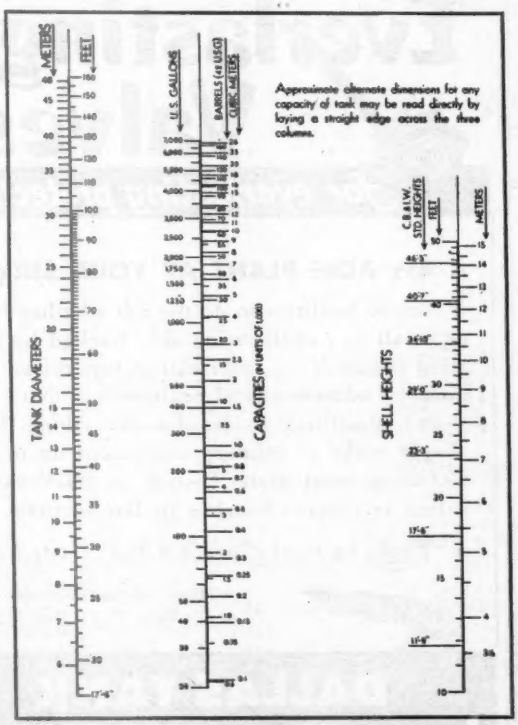
A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

# Fixed Roof Tanks

REGULAR fixed roof tanks are the main storage for refineries. With crude oil or gasoline they permit large vapor losses by breathing and during filling. Umbrella or dome roofs are used on some small tanks to avoid internal framework but larger tanks have conical roofs supported by internal columns, and roof rafters and girders. Thicker plate is used on the bottom (and lower) courses or rings of plate, and the thinner upper courses are built up in a shingled or an in-and-out manner. Cone roofs are built with slopes of 1¼ in. to 2¾ in. per foot; larger roofs having smaller slopes.

**Costs, dimensions, etc.**—The cost of storage tanks depends primarily upon their capacity, current steel prices, and to some extent on the shape (i.e. tall or low). The costs (1929-1941 without foundations), dimensions and weights, including roofs, of common storage tanks are shown in the tabulations. Corrections of costs for current variations can be most easily handled by ratios of the costs of steel plate and hence, weights are included in the tabulations. The costs on a pound basis ranges from 8.5 cents per pound for the smallest tanks to about 5 cents for the largest. The nomograph may be used to estimate the capacities of off-size tanks by using a straight edge, i.e., for a 78-ft. diameter tank, of a height of 40 ft., connect 40 on the right with 78 on the left and read 34 on the center scale which means 34,000 bbl.

Tanks are usually equipped with shell and roof manholes, a screened vent, water drawoff, stairway or ladder, gage hatch and a suction and discharge connection; and often also with a swingpipe, connections for foam system, heating coil and pressure and vacuum vents as well.




*Nomograph for estimating capacities of off-size tanks. (Courtesy Chicago Bridge & Iron Works)*

**RUNDOWN OR STOCK TANKS—RIVETED—¼-IN. SHELL AND BOTTOM***

| Capacity bbl. | Diameter (ft.-in.) | Height† (ft.-in.) | Weight (lb.) | Approx. cost ($/bbl.) |
|---|---|---|---|---|
| 100 | 7-10 | 11-9 | 4,700 | 3.80 |
| 150 | 9- 6 | 11-9 | 5,900 | .... |
| 200 | 11- 0 | 11-9 | 7,100 | 2.80 |
| 250 | 12- 8 | 11-9 | 8,500 | .... |
| 300 | 13- 6 | 11-9 | 9,200 | 2.45 |
| 400 | 15- 7 | 11-9 | 11,200 | .... |
| 500 | 17- 6¼ | 11-9 | 13,100 | 2.15 |
| 600 | 19- 1 | 11-9 | 14,800 | .... |
| 750 | 21- 6 | 11-9 | 17,500 | 1.90 |
| 1,000 | 24- 7 | 11-9 | 21,300 | 1.64 |
| 1,250 | 27- 9 | 11-9 | 25,400 | .... |
| 1,500 | 30- 6 | 11-9 | 29,100 | 1.33 |
| 1,800 | 33- 0 | 11-9 | 32,900 | .... |
| 2,000 | 35- 1½ | 11-9 | 36,200 | 1.16 |
| 2,200 | 36- 6 | 11-9 | 38,400 | .... |
| 2,500 | 30- 0 | 11-9 | 42,700 | 1.06 |

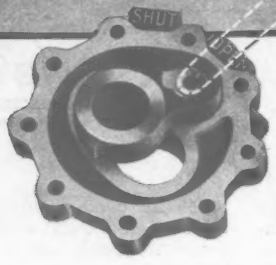
*A plate thickness of $\frac{3}{16}$-in. is also widely used. †A height of 17 ft. 6 in. is also used.

**A.P.I. OIL STORAGE TANKS—RIVETED**

| Capacity bbl. | Diameter (ft.-in.) | Height (ft.-in.) | Weight (lb.) | Approx. cost ($/bbl.) |
|---|---|---|---|---|
| 5,300 | 36 | 29- 6 $\frac{1}{16}$ | 57,900 | 0.80 |
| 6,400 | 36 | 35- 3 $\frac{3}{16}$ | 65,800 | .... |
| 7,400 | 36 | 41- 1½ | 75,700 | 0.66 |
| 8,400 | 36 | 46-11 $\frac{7}{16}$ | 85,700 | .... |
| 9,500 | 48 | 29- 5 $\frac{7}{16}$ | 87,500 | 0.61 |
| 11,300 | 48 | 35- 2 $\frac{1}{16}$ | 100,700 | .... |
| 13,200 | 48 | 41- 0 $\frac{5}{16}$ | 114,400 | 0.56 |
| 15,000 | 48 | 46- 9 $\frac{7}{16}$ | 130,100 | 0.54 |
| 15,000 | 60 | 29- 3 $\frac{3}{16}$ | 139,000 | 0.58 |
| 17,500 | 60 | 35- 0 $\frac{1}{16}$ | 157,500 | .... |
| 20,500 | 60 | 40-10 $\frac{7}{16}$ | 179,400 | 0.50 |
| 23,500 | 60 | 46- 7¾ | 205,700 | .... |
| 25,000 | 78 | 29- 4 $\frac{5}{16}$ | 214,800 | 0.47 |
| 30,000 | 78 | 35- 1½ | 244,000 | .... |
| 35,000 | 78 | 40- 1¼ | 277,800 | 0.44 |
| 39,500 | 78 | 46- 6 $\frac{7}{16}$ | 315,600 | .... |
| 42,500 | 102 | 29- 3 $\frac{1}{16}$ | 353,100 | 0.42 |
| 51,000 | 102 | 35 .... | 400,900 | .... |
| 59,000 | 102 | 40- 8 $\frac{3}{16}$ | 454,800 | 0.40 |
| 59,000 | 120 | 29- 2 $\frac{3}{16}$ | 470,300 | .... |
| 68,000 | 102 | 48- 5 $\frac{1}{16}$ | 523,100 | 0.39 |
| 70,000 | 120 | 34- 1 | 532,800 | .... |
| 82,000 | 120 | 40- 7 $\frac{5}{16}$ | 604,400 | 0.38 |
| 85,000 | 144 | 29- 2¼ | 675,100 | .... |
| 93,000 | 120 | 46- 3 $\frac{1}{16}$ | 691,800 | .... |
| 101,000 | 144 | 34-10¼ | 766,100 | .... |
| 118,000 | 144 | 40- 6 $\frac{1}{16}$ | 873,500 | .... |
| 134,000 | 144 | 46- 1¾ | 990,400 | .... |

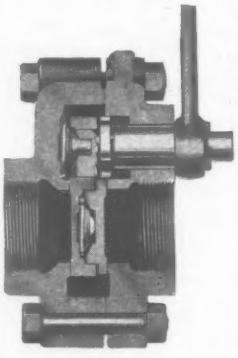
**No. 4 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa**

# THE VALVES THAT DON'T JAM —DON'T STICK




*Everlasting Valve opened up to show operation of disc and seat.*

WHEREVER instant, positive valve action is imperative in oil fields and refineries, the dependability of Everlasting Valves has become traditional. Operators know they can rely implicitly on these valves to open promptly to full-pipe size, straight-through flow, or close to a drop-tight seal—with one quick, 70-degree push on the wrench lever.



Self-compensating, self-grinding action keeps Everlasting Valves free from sticking, binding or wedging. The straight-through flow averts clogging. The heavy construction and selected metals used insure extra long service.

Drilling boilers and engines; blow-off, discharge and release lines; gasoline and oil loading racks; storage and measuring tanks; fire protection lines; water column shut-off and drains; these and innumerable other services call for the instant-action, full-opening, drop-tight operation provided by Everlasting Valves.

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In pipeline construction and operation . . . Strom Balls in ditching machines, shovels, cranes, tractors, gas engine compressors and pumping stations . . . are reducing frictional resistance and aiding the Petroleum Industry in its wartime demands. Strom Steel Ball Co., 1850 South 54th Avenue, Cicero 50, Ill.

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*for everlasting protection*

**A 4½ ACRE PLANT AT YOUR SERVICE**

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**CITIES SERVICE OIL CO. 1 VACEK**
330 ft. south and 330 ft. west of C 32-15s-10w.
Elevation 1,833 ft.

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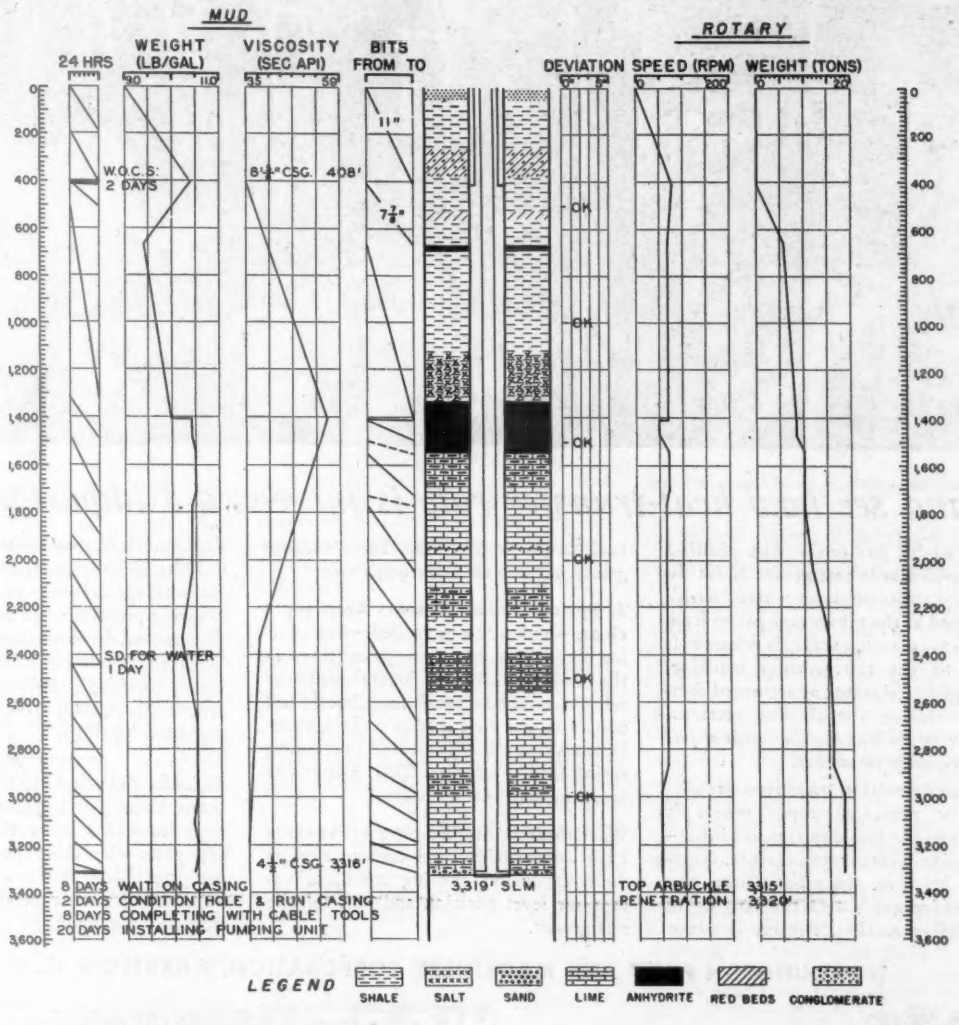



### DRILLING DATA

| Time record— | Hours | Days |
|---|---|---|
| W.O.C., 8⅝-in. surface pipe | 48 | 2 |
| Shutdown for water | 24 | 1 |
| Impassible roads | 144 | 6 |
| Conditioning hole | 24 | 1 |
| Waiting on cable tools | 240 | 10 |

### PRODUCTION TEST

| | |
|---|---|
| Date | 6-9-44 |
| Time pumped (hours) | 24 |
| Oil (bbl.) | 108 |
| Water | None |

### COMPLETION DATA

| | Hours | Days |
|---|---|---|
| W.O.C., oil string, 4½-in. | 48 | 2 |
| Completing with cable tools | 164 | 7 |
| Installing pump | 456 | 19 |
| Acidized (gal.) | | 500 |

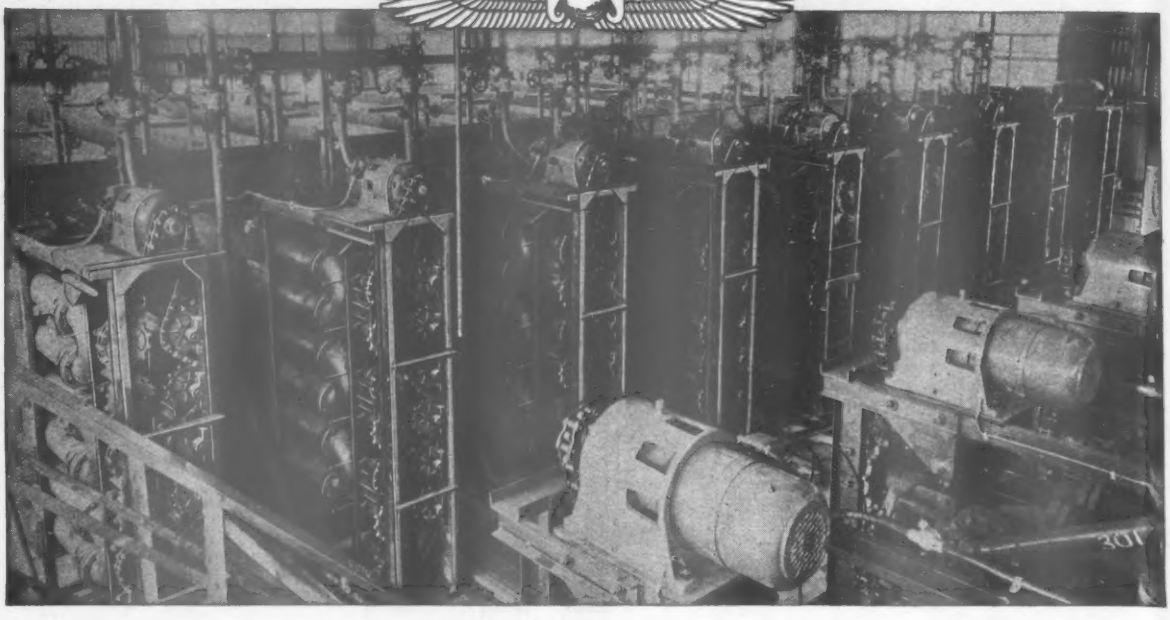
### BIT SUMMARY

| Type— | Number | Size (in.) |
|---|---|---|
| Rock bit | 1 | 11 |
| Rock bit | 14 | 7⅞ |
| Rock bit (reruns) | 2 | 7⅞ |

### CASING AND TUBING RECORD

| Size (in.) | Depth (ft.) | Cement (sacks) |
|---|---|---|
| 8⅝ | 408 | 150 |
| 4½ | 3,316 | 150 |

# LET'S FOLLOW THE REFRIGERANT THROUGH A WORTHINGTON DOUBLE-PIPE CHILLING MACHINE



## . . . and see how heat-transfer rate is increased 3 important ways

**1. No "flash" gas enters the chilling sections**—Volatile refrigerant is fed directly into an accumulator where "flash" gas, formed as the refrigerant passes from liquid to evaporating stage, is released. It returns to the refrigerating machine. Only liquid refrigerant at saturated temperature reaches the chilling sections. *Thus, you get the heat-transfer benefit of full evaporation where you need it.*

**2. Inclined position improves circulation**—The refrigerant-vapor outlet is higher than the liquid refrigerant inlet—an exclusive Worthington feature. Gravity-flow fed from the accumulator, the liquid refrigerant enters the bottom of each chilling section. Surplus is swept back to the accumulator. *This circulation greatly increases the heat transfer rate.*

**3. Spring-loaded scrapers keep pipes clean**—As fluid to be chilled—wax-bearing oil or other solutions—passes through the inside pipes, it transfers its heat to the refrigerant. The crystals form but do not adhere to the cold surface as inside surfaces are continuously cleaned by rotating spring-loaded scrapers. This insures the most efficient heat transfer.

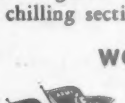
**Worthington double-pipe exchangers** have same design, and construction as direct-expansion chilling machines except for level position and non-volatile refrigerant.

**Full details in new Bulletin C-1100-B-15**

This new bulletin describes other unique features: special safety scraper drive with shearing protection for each section; easily removed drive shaft with pressure lubricated bearings; external ball-type thrust bearings; improved chain-and-sprocket-type main drive with adjustable outboard bearings.

Write for Bulletin C-1100-B-15 today and learn how Worthington's experience for more than fifty years with this type of equipment has resulted in improved design, construction and operation.

**WORTHINGTON PUMP AND MACHINERY CORPORATION, HARRISON, N. J.**

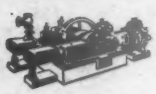


FIVE MORE REASONS WHY WORTHINGTON LEADS IN INDUSTRIAL REFRIGERATION

BEHIND THE NAME WORTHINGTON

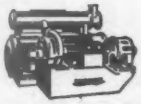
AR4-13

1. Horizontal compressors for ammonia, propane, butane



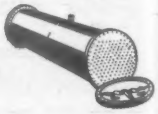
2. Angle engine compressors

3. Centrifugal compressors



4. Absorption refrigerating machines

5. Shell and tube refrigerating equipment



# Natural Gas

## Cities Service Expansion Is Approved by FPC

WASHINGTON. — Federal Power Commission has approved the application of Cities Service Gas Co., Bartlesville, Okla., for permission to install new facilities designed to increase the daily capacity of the 231-mile Hugoton natural gas pipe line in Oklahoma from 140,000,000 cu. ft. to 213,000,000.

The commission also authorized the company to operate the recently constructed $9,000,000 Hugoton line until June 30, 1945, under lease from Cities Service Transportation & Chemical Co., Ponca City, Okla., which laid the pipe. The 26-in. line was built to relieve a natural-gas shortage in Oklahoma, Kansas, Missouri and Nebraska.

FPC gave its permission for the Ponca City company's proposed financing to become effective, subject to the condition that the company shall not pay its parent—Empire Gas & Fuel Co. — any interest in excess of the actual cost to Empire of obtaining funds advanced to the subsidiary company.

The facilities authorized include short pipe lines to collect gas from 37 new natural-gas wells which will be drilled in the Hugoton field, and carry it to the main pipe line.

The line, which was put in operation this year, extends from the Hugoton gas field in Texas County to the gas company's Blackwell station in Kay County, Oklahoma.

Cities Service Gas Co. serves a wide area in northern Oklahoma, eastern Kansas, southern Nebraska and western Missouri, including the metropolitan areas of Kansas City, St. Joseph, Joplin and Springfield, Mo., and Kansas City, Lawrence, Topeka, Leavenworth, Wichita and Hutchinson, Kans.

## I.N.G.A.A. to Intervene in Case of Memphis Natural

OKLAHOMA CITY.—Independent Natural Gas Association of America has received permission to intervene in a hearing before Federal Power Commission in connection with the application of Memphis Natural Gas Co. to expand its pipe-line facilities. The intervening petition asserts that in this hearing FPC has "for the first time denied a certificate of public convenience and necessity to an existing natural-gas company to enlarge its facilities on the ground that the available natural-gas resources should be conserved, in so far as possible, for domestic, commercial and superior industrial uses."

Alleging that this holding is of tremendous importance to the natural-gas industry, the petition requests upon rehearing that FPC adhere to its former decision that it is without congressional authority to decide who shall use natural gas and for what purpose. Such rehearing will be held in Washington on September 7.

A committee composed of E. Buddrus, Chicago, president of the association; W. H. Wildes, Dallas, and Mark H. Adams, Wichita, Kans., was appointed to represent the association before Interstate Oil Compact Commission in an advisory capacity. This action was taken in response to an invitation of the commission to participate in its proceedings.

## United Utilities Asks Right To Sell Gas Properties

PHILADELPHIA.—Securities and Exchange Commission conducted a hearing July 17 on a proposition of United Utilities, Inc., and its subsidiary, Central Gas Utilities Co., Abilene, Kans., to dispose of certain utility assets. It is planned to sell to Reece E. McGee, of Blackwell, Okla., a nonaffiliate, gas wells, pipe lines and gas-distribution systems comprising the western divisions of Central Gas Utilities Co. in Colorado and Kansas, for $1,000,000.

Proceeds would be used to discharge Central Gas' noted indebtedness in the principal amount of $349,000 to United Utilities and to cancel or redeem part of its capital stock.

United Utilities has asked an order exempting it and all its subsidiaries from provisions of the holding-company act after consummation of the sale when the holding company and its subsidiaries would be predominantly intrastate, carrying on their business substantially in Kansas.

## Southern Natural Seeks to Expand Pipe-Line Systems

WASHINGTON. — Federal Power Commission has set August 22 as the date for a hearing on the application of Southern Natural Gas Co., Birmingham, for authority to expand its pipe-line facilities. The company plans to construct and operate loop lines varying in diameter from 10 to 22 in. and in length from 687 ft. to about 27 miles, in Perry, Dallas and Jefferson counties, Alabama; Issaquena County, Mississippi, and Fulton and Bibb counties, Georgia; lines, heaters and meters in the Logansport, La., gas field, and miscellaneous compressor station and pipe-line equipment. It is planned also to construct and operate about 5 miles of 4-in. line near Spaulding, Jefferson County, Ala., seven air-cooled mufflers on seven 1,300-hp. gas compressors at the applicant's Perryville, La., compressor station, two gas scrubbers at the Logansport dehydration plant, and appurtenant facilities.

# Natural Gasoline

## Another High Attained in Natural-Gasoline Output

WASHINGTON. — Daily average output of natural gasoline and associated products scored a new high record of 11,214,000 gal. in May, according to U. S. Bureau of Mines. This compares with 10,959,000 gal. in April. Most of the gain is attributable to the rapid increase in the Louisiana Gulf district, with less important advances in the Texas Gulf and other Texas areas.

Stocks rose 9,366,000 gal. during the month, totaling 186,312,000 gal. on May 31, compared with 227,094,000 on May 31, 1943. Output of cycle products and natural gasoline increased 23 and 5 per cent respectively. Liquefied petroleum gases fell 4 per cent from April figures. Use of natural gasoline and associated products increased at refineries, and movement of natural gasoline and cycle condensate to retail outlets was lower than in April.

**PRODUCTION**
(Thousands of gallons)

| | May | April |
|---|---|---|
| Natural gasoline | 186,186 | 177,450 |
| Cycle products | 72,870 | 59,346 |
| Liquefied petroleum gases: | | |
| Isobutane* | 15,666 | 15,792 |
| Other L.P.G.* | 72,912 | 76,188 |
| Liquefied refinery gas | 12,222 | 13,734 |
| Benzol | 8,400 | 8,400 |
| Total production | 368,256 | 350,910 |

*At natural-gasoline and cycling plants.

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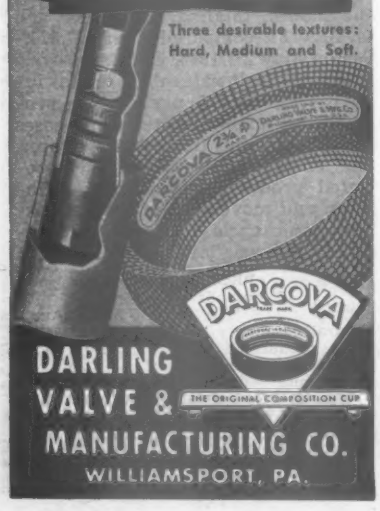


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# REFINING

## Union Plant to Increase Its 100-Octane Production

LOS ANGELES. — Production of 100-octane gasoline by Union Oil Co. of California will be increased further before the end of the year at its new $12,000,000 catalytic cracking plant, according to Reese Taylor, president, in his semiannual report. The company's modernization project in Wilmington is one of the country's largest privately financed wartime refinery enterprises.

"Among the new units to be completed," Taylor says, "are a combination crude distillation and cracking unit, the newest of its type in the country; an alkylation plant and isomerization unit to be used in aviation-gasoline production, and redistillation and treating facilities."

## Bell-Roberts to Put Desda Refinery Into Operation

ALBANY, Ky.—The small refinery at Desda, built several years ago by Louisville men and closed later, has been bought by Bell-Roberts Oil Co., of Louisville. The plant has been reconditioned, and it is said the new owners will begin buying and refining crude at once. Bell-Roberts is headed by Clarence L. Bell and L. C. Roberts.

## Gravity Scale for Fuel-Oil Prices Now Discarded

WASHINGTON.—Office of Price Administration on August 1 abolished the gravity scale as a basis for prices of fuel oils and blends of fuel oils with distillates. The old commercial standard basis, setting up a single price for No. 6 fuel oil, has taken its place.

Dollars-and-cents prices are established for 23 refinery and tanker terminal areas, the price per 42-gal. barrels for No. 6 set at the former ceiling for 13-15.9 gravity fuel oil, varying from 92 cents to $2.16.

Amendment No. 13 to maximum price regulation No. 88 is expected to increase production of distillate fuel oils, and simplify marketing procedures by eliminating the numerous grades, on a gravity basis, of No. 6, OPA said.

Fuel oils with lower viscosities than No. 6 will have either the ceiling prices established under other provisions of the regulation, or the new No. 6 ceiling, whichever is higher.

OPA illustrated the new system with this example:

In Oklahoma, which is in price area B, and along the Gulf Coast, which is in price area D, the current ceiling for 13-15.9 gravity fuel oil is 97 cents per barrel. This becomes the new ceiling for No. 6 fuel oil in those areas. In price area M, which comprises all East Coast refineries and tanker terminals from Norfolk, Va., north, the current ceiling is $1.77, which becomes the No. 6 fuel-oil ceiling in that area.

In establishing the new prices, OPA returns to the pricing system for residual fuel oil that was in effect prior to the adoption, at the request of the industry and the Petroleum Administration for War, of the gravity scale of pricing.

Although the new prices went into effect on August 1 at tanker terminals and refineries, OPA said that sellers at other shipping and delivery points, such as tank wagons and at small bulk plants, might continue to use the old ceiling prices, on a gravity basis, until their inventories as of August 1 are disposed of, but in no case may the old prices be used later than September 1.

When the gravity system of pricing was established on March 3, 1943, there was a critical deficiency of residual fuel oils in almost all parts of the country, owing to increased railroad, industrial and naval activities, as well as reductions in refinery operations resulting from curtailed marine transportation of petroleum products.

Now, however, OPA pointed out, the shortage of distillate has become more acute than the shortage of residual fuels, and the current market indicates a diminishing demand for extremely light residual fuels when sold for uses normally requiring No. 6 fuel oil.

In addition, OPA said, it is the judgment both of OPA and of PAW that the continuance of the gravity scale is not a prerequisite to the production of the necessary amounts of oil.

However, under the new action, consideration was given to the fact that the volume of production of residual fuel oil must continue at a higher level than obtained during

the 60-day period preceding October 15, 1941, the base pricing period, and for that reason a higher price is established for No. 6 commercial standard specifications than the price in effect before the gravity scale was adopted.

## Walton Returns to Faculty Of Oklahoma University

J. S. Walton has returned to his position as professor of chemical engineering at University of Oklahoma after a year's leave of absence during which he was consultant for American contractors engaged in construction work in the Canadian Northwest and Alaska. He also served as a part-time technical consultant for Rubber Reserve Corp. on problems connected with catalytic production of butadiene.

Prior to joining the university staff in 1941 Professor Walton spent 13 years with major industrial companies in the petroleum industry.

## Selection of Synthetic-Fuel Plant Site Expected

WASHINGTON. — Representative Randolph, of West Virginia, author of approved legislation for development and processing of synthetic liquid fuel from coal, oil, shale and agricultural and forest products, expressed belief the site for a plant for experimentation and demonstration of the synthetic fuel would be announced soon. He made this statement after a conference with R. R. Sayers, director of Bureau of Mines.

Randolph said there was need for continued and increasing development of synthetic gasoline, both for war and postwar use. He said that in addition to the well-known soft-coal and forestry areas which would benefit from the synthetic process developments, there would be: Colorado, with an estimated 47,255,598 bbl. of recoverable oil in shale, and Utah, with an estimated 25,680,000 bbl. States with lesser, but important quantities are Kentucky, Indiana, Pennsylvania, West Virginia, and Nevada.

## Gulf Coast Gasoline Stocks Resume Their Decline

HOUSTON. — Gasoline stocks of the 11 operating companies in Gulf Coast Refiners Association, which registered a mild upturn in the second half of June, resumed their decline during the first half of July, totaling 1,164,421 bbl. This was a drop of 107,463 bbl. from the 1,271,884 bbl. reported June 30, establishing a new low for the 5 years since the association was organized. A year ago total gasoline stocks held by the association group were 1,791,568 bbl. or 627,147 more than are now in inventory. Automotive gasoline stocks, considered alone, were 449,878 bbl. on July 15, an increase since June 30 of 69,295 bbl. This total represents about 65 per cent of the 685,663 bbl. of automotive gasoline in tanks at this time last year. About one-fifth of the current stocks of automotive gasoline is a special military grade and not available for civilian use.

Kerosene stocks were at 173,539 bbl. on July 15, a rise of 8,264. Diesel gas oil stocks totaled 51,078 bbl., a drop of 5,951. Stocks of several other grades of gas oil decreased 65,492 bbl. from 828,956 on June 30 to 763,474 on July 15.

Stocks of heavier fuels continued low. No. 5 fuel oil, reported at 155,391 bbl., decreased 160,554, and Bunker C fuel oil stocks at 331,479 bbl. on July 15 reflected a decrease of 83,644. Cutback asphalt stocks were reported at 26,034 bbl.

Total stocks of all products in the association refineries were reported at 2,894,539 bbl. on July 15, a decrease of 413,705 during the first half of the month, and compare with stocks of 3,342,540 bbl. a year ago, when crude runs to stills were at a greatly reduced rate.

Crude runs decreased from 128,408 bbl. to 118,676 daily, because of plants being shut down for cleanout during the first half of July.


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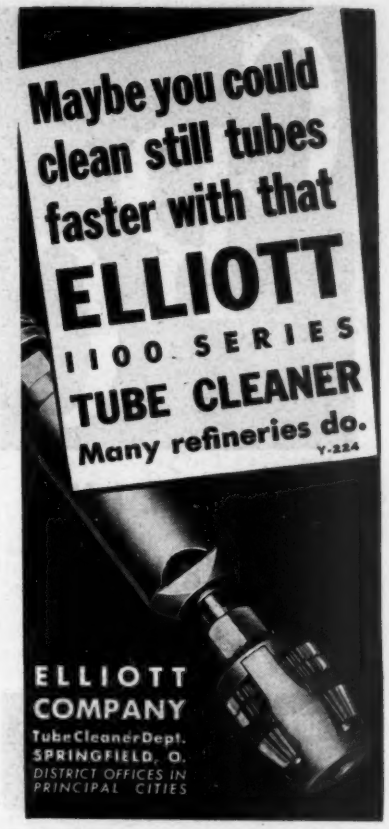

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PIPE LINE CONSTRUCTION EQUIPMENT

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Pipe Line Equipment and Materials
Houston, Texas, U. S. A.

# PIPE LINES

## Almost Half of Stanolind's Wyoming Line Now Laid

Up to the beginning of this week approximately 105 miles of pipe has been laid for the crude-oil line of Stanolind Pipe Line Co. from Elk Basin to Casper, Wyo. The length of the entire route for the 12-in. line for this project has been determined to be 232 miles according to a survey recently completed, instead of 235, as previously estimated. Some shortening was possible through changes in the right-of-way. The pipe already laid represents 45 per cent of the total required for the undertaking.

Building of three tanks started this week at Elk Basin where steel plates recently arrived for erection on tank grades which have been completed. Construction of stations is reported to be progressing satisfactorily.

## Bayou Breaks Record With High Throughput

Bayou Pipe Line System set a new delivery record for July by pumping a daily average of 64,569 bbl. of products from the Houston-Texas City and Beaumont-Port Arthur refineries into the Plantation Pipe Line terminal at Baton Rouge. Products moved in the 31-day period included 1,492,443 bbl. of housebrand gasoline, 397,737 bbl. of premium gasoline, and 111,479 bbl. of kerosene.

## Laying of Creole's Line In Venezuela Progresses

Work has progressed steadily since laying of pipe for Creole Petroleum Corp. commenced July 21 for the 116-mile 16-in. crude-oil line from the Jusepin area to Puerto la Cruz in eastern Venezuela. Additional materials are reported to be arriving so as to complete the project within the scheduled construction period of 60 days. Plans call for moving camp to two or three locations along the route to accommodate the men of the organization laying the line which comprises one spread.

Construction operations are handled by Oklahoma Contracting Co., S.A., under direction of Paul Halbert with headquarters at Puerta la Cruz. M. K. McFarland is in charge of the firm's office at Caracas. T. R. Jones and T. A. Hester of Oklahoma Contracting, are preparing to leave for Venezuela for an inspection trip.

## Contracts to Be Awarded for Iles Pool, Colorado, Line

Contracts were to be let this week, according to report, for laying a 111-mile 6-in. line for Utah Oil Refining Co. It is expected that one spread will work south from the Utah company's Fort Laramie, Wyo.-Salt Lake City, Utah, crude-oil trunk line while another spread will go north from the Iles pool. It is believed that after a decision has been reached at Salt Lake City headquarters regarding the letting of the contracts the project will be supervised by Stanolind Pipe Line Co. acting as agent.

The Sign of GOOD PIPE LINE CONSTRUCTION

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## Hope Conducts Extensive Enlargement Program

Due to the expected receipt some time before the first of the year of 100,000,000 cu. ft. of gas daily, Hope Gas Co. is now working on two major projects to distribute this gas throughout its system.

This new supply of gas will come into Cornwell Station, W. Va., which is at the southern end of the pipe system, and which at present has 7,000 hp. of steam-driven gas compressors installed. The new work will consist of the addition of another 1,000 hp. and the complete rebuilding of the piping system to add a fourth stage to the present three-stage layout. Going north from Cornwell are two main discharge lines. A 20-in. line, designed for 350 lb., built in 1925; and a 12¾-in. line, ⅜-in. thick, designed for 1,350 lb., built in 1936, and 95 miles long to where it discharges into the 300-lb. discharge system at Hastings, W. Va. Up to now, this 12¾-in. line has been operated at about 1,000 lb. pressure, which gave a capacity of 75,000,000 cu. ft. daily. After the new installation and repiping, the pressure on this line will be raised to the design pressure of 1,350 lb., giving a capacity of 100,000,000 cu. ft. daily. There is, also, being added a new glycol dehydration plant to dry up the gas in the 20-in., and changes in the present dehydration plant on the 12¾-in., which will reduce the water content of the gas in this line to 2.5 lb. of water per 1,000,000 cu. ft.

After the receipt of this gas from Texas, the Hope company will be in position to supply added markets, and for this reason was granted authority by Federal Power Commission to lay a line into northern Pennsylvania to take care of the serious shortage now existing in that and the New York State areas, due to the rapid decline in recent years of the local gas supply there. For this purpose, the Hope and its associate company, the New York State Natural Gas Co., are now laying a 12¾-in. o.d. pipe line, 145 miles long, from Hastings, W. Va., to Clarion County, Pennsylvania. This line has been designed for 1,300 lb. pressure, but the thickness is only 9/32-in., as the quality of steel has been improved materially since 1936. The specification of the steel in this line called for 48,000 lb. yield point and 70,000 lb. ultimate strength. As the soil in this country is nearly neutral and the life of bare pipe is around 40 to 50 years, only about 15 miles of the line is to be coated and wrapped, the remainder being bare, except for a mill coat of enamel.

At the present time, the Hope company is installing at Hastings, 4,000 hp. of additional steam-driven compressors to pump the gas through this new line, and a new boiler to operate on either powdered coal or gas, although it is expected that due to its location in a high-grade coal field, operation will be entirely on coal. This addition will bring the installed horsepower at Hastings station up to 33,000 hp., making it the largest station in the industry.

All of these additions are expected to be completed around November 1, so that the shortages which existed last winter, in the area served by supplies transmitted through the Hope system, will be alleviated before the arrival of extremely cold weather.

## Drumright-Sycamore Loops Of Stanolind Started

Welding of loops along the Drumright, Okla.-Sycamore, Kans., section of Stanolind Pipe Line Co.'s trunk line commenced last week. Stringing of pipe and ditching started July 27. Construction of the loops has been contracted by C. S. Foreman Co. and Jones & Brooks.

## Texas-New Mexico Has Permit for Outlet

Texas-New Mexico Pipe Line Co. received approval from War Production Board to lay 3 miles of 4-in. pipe from its McCamey station in southwestern Upton County to the Hobbs pool in southeastern Crane County, Texas. This pool was opened by The Texas Co. 1 Hobbs, which has indications of producing approximately 250 bbl. of oil daily with pay from 5,365 to 5,390 ft. in a Devonian formation.

## Great Lakes Reconditioning Is Under Way Near Fairfax, Okla.

Reconditioning of a 6-in. products line from the Barnsdall station to Ponca City, Okla., is being done now for Great Lakes Pipe Line Co. in the vicinity of Fairfax, Okla., by a crew of A. C. Holder Construction Co. Already two loops have been completed for work specified in the second contract, which includes a 10-mile and an 8-mile section on the Barnsdall-Ponca City spur which have been completed and another 8-mile section on which work is now going on. Earlier in the year work was completed on the first contract for sections of the line from the vicinity of Tulsa to Barnsdall.


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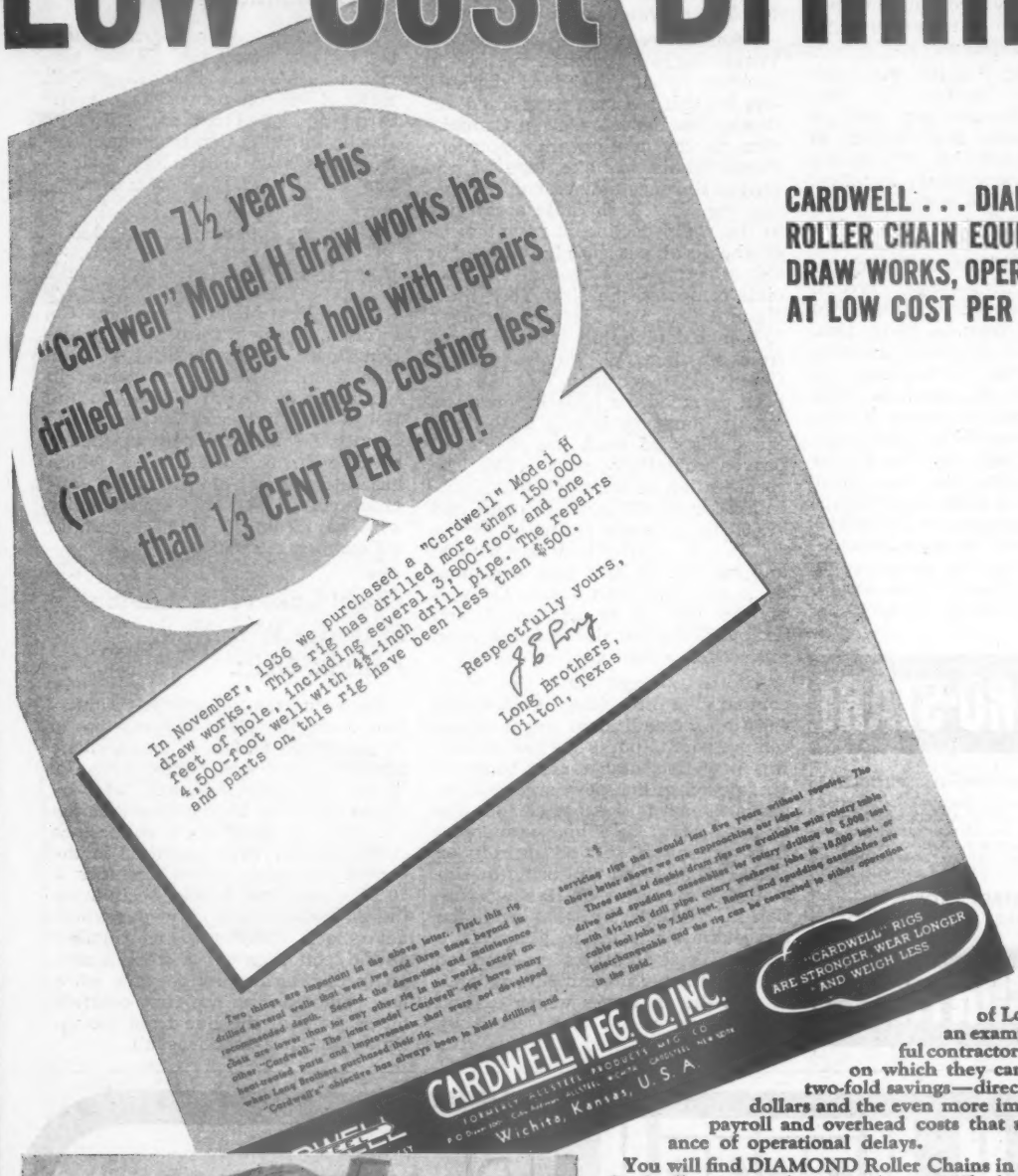
# Low Cost Drilling!


In 7½ years this "Cardwell" Model H draw works has drilled 150,000 feet of hole with repairs (including brake linings) costing less than ⅓ CENT PER FOOT!
In November, 1936 we purchased a "Cardwell" Model H draw works. This rig has drilled more than 150,000 feet of hole, including several 3,800-foot and one 4,500-foot well with 4½-inch drill pipe. The repairs and parts on this rig have been less than $500.
Respectfully yours,
J B Long
Long Brothers,
Olton, Texas
Two things are important in the above letter. First, this rig drilled several wells that were ten and three deep beyond its recommended depth. Second, the down-time and maintenance costs are lower than for any other rig in the world, except another "Cardwell." The latter model "Cardwell" rigs have many heat-treated parts and improvements that were not developed when Long Brothers purchased their rig.
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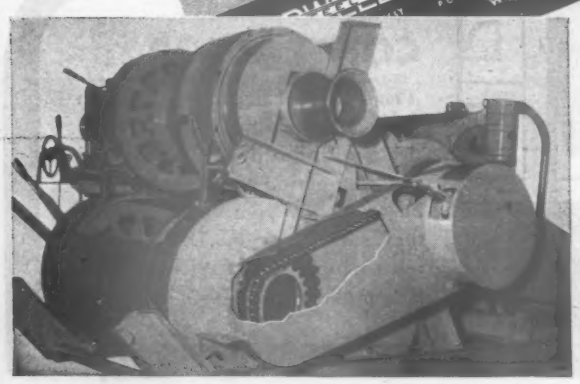

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**DIAMOND ROLLER CHAINS**

# Exploration and Drilling

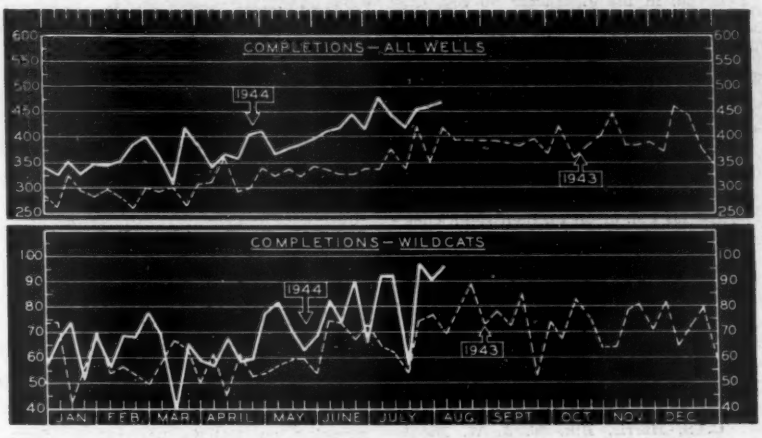
## Week's Highlights

WILDCATTING calls for courage to take risks to back one's convictions. Company executives risk their reputations as sound business men of good judgment; geologists risk their professional reputation. This week a group who had the courage to take risks to back up their convictions are feeling happy.

Barnsdall Oil Co. and Sohio Producing Co. 2 Heilbron, a wildcat 6 miles southwest of Texarkana, found the first Smackover lime production in the State of Texas. The Smackover has been found productive in several fields in southwestern Arkansas and produces some oil in northern Louisiana. Theoretically, the Smackover might be productive in a zone extending from south central Arkansas westward through Texas to a point where it is thought to turn southward west of and roughly parallel to the Balcones fault. But, until the new wildcat found production, no Smackover oil had been found west of Arkansas, although several tests had sought that pay.

The Barnsdall-Sohio group drilled 1 Heilbron and found the Smackover containing a show of heavy, black oil and water. Some companies might have dropped the matter after one test, but the geologists decided the first well was too low on structure and when company officials backed them up, moved just 680 ft. and drilled 2 Heilbron. The geologists' predictions were verified when the second well found the Smackover porous zone high, but when the casing was perforated at 7,676-86 ft., the well produced about 100 bbl. of distillate per day with a large volume of highly nitrogenous gas, reports indicating possibly 60 per cent nitrogen content.

The gas and distillate were squeezed off and the well deepened 15 ft. below the casing seat at 7,716 ft., where it found 40° gravity oil, flowing 70 bbl. in 18 hours through a ⅛-in. choke, and 136 bbl. in 19 hours through a ¼-in. choke. As the gas-oil ratio is very high, it is believed that all the nitrogenous gas has not been cased off and a liner will be run to try to shut off the gas and determine how much oil pay zone the Smackover has.




*Solid line charts current weekly completions*

### COMPLETIONS IN ALL FIELDS . . .

**Week ended August 5, 1944**

| | Oil | Gas | Dry | Total | Footage | Total Comp. to date 1944 | 1943 |
|---|---|---|---|---|---|---|---|
| N. Y., Penna., W. Va. | 52 | 22 | 7 | 81 | 138,083 | *1,930 | 1,999 |
| Ohio | 3 | 8 | 13 | 24 | 63,706 | 567 | 507 |
| Indiana | 2 | 0 | 4 | 6 | 14,686 | 127 | 135 |
| Kentucky | 15 | 1 | 5 | 21 | 32,704 | 403 | 223 |
| Illinois | 18 | 0 | 23 | 41 | 109,379 | 1,050 | 1,020 |
| Michigan | 4 | 0 | 5 | 9 | 22,361 | 364 | 318 |
| Kansas | 14 | 0 | 16 | 30 | 100,783 | 1,050 | 953 |
| Nebraska, Missouri, Iowa | 0 | 0 | 3 | 3 | 4,891 | 19 | 27 |
| Oklahoma | 27 | 3 | 25 | 55 | 172,650 | 1,000 | 665 |
| Texas: | | | | | | | |
| North Central | 11 | 0 | 14 | 25 | 56,987 | 847 | 808 |
| West | 25 | 0 | 11 | 36 | 162,164 | 883 | 491 |
| Panhandle | 3 | 0 | 1 | 4 | 12,551 | 128 | 107 |
| Eastern | 0 | 0 | 1 | 1 | 3,223 | 195 | 161 |
| Gulf Coast | 17 | 1 | 12 | 30 | 200,620 | 686 | 257 |
| Southwest | 4 | 1 | 13 | 18 | 62,866 | 427 | 535 |
| Total Texas | 60 | 2 | 52 | 114 | 498,411 | 3,166 | 2,359 |
| Louisiana: | | | | | | | |
| Northern | 2 | 2 | 3 | 7 | 14,697 | 171 | 188 |
| Southern | 7 | 0 | 2 | 9 | 74,295 | 283 | 219 |
| Total Louisiana | 9 | 2 | 5 | 16 | 88,992 | 454 | 407 |
| Arkansas | 3 | 0 | 0 | 3 | 14,496 | 128 | 142 |
| Mississippi | 0 | 0 | 3 | 3 | 15,465 | 80 | 55 |
| Southeastern States | 0 | 0 | 0 | 0 | 0 | 21 | † |
| Montana | 5 | 3 | 2 | 10 | 20,233 | 188 | 117 |
| Wyoming | 2 | 0 | 1 | 3 | 11,382 | 94 | 71 |
| Colorado-Utah | 1 | 0 | 0 | 1 | 5,975 | 18 | 16 |
| New Mexico | 1 | 1 | 0 | 2 | 9,988 | 227 | 126 |
| California | 38 | 0 | 10 | 48 | 192,702 | 1,166 | 756 |
| Total United States | 254 | 42 | 174 | 470 | 1,516,887 | 12,052 | 9,896 |
| Total previous week | 272 | 55 | 132 | 459 | | | |
| Total August 7, 1943 | 231 | 31 | 153 | 415 | | | |

*Does not include 50 pressure wells. †Included in total shown for Mississippi.

# N. CENTRAL TEXAS

## Three Counties Receive New Wildcat Locations

WICHITA FALLS.—Clay, Montague and Cooke counties received new wildcat locations during the past week. Shell Oil Co., Inc. is starting 1-A Hapgood as a 6,700-ft. wildcat 7 miles northwest of Bellevue, in the J. Walker Survey, Clay County. In Montague County, 2 miles southwest of Belcherville, Gulf Oil Corp. 1-E W. T. Ferguson, in SE corner of Lot 1, W. Watson Survey A-833, will be drilled to 6,000 ft. Texas Co. is starting a 4,500-ft. wildcat in Cooke County at 1 C. C. Hildebrand, about 6 miles northwest of Muenster, in the R. Trevino Survey A-1015.

**Young County.**—Standard Oil Co. of Ohio 1 J. R. Garvey, new Caddo lime discovery north of Farmer, on potential test flowed 169 bbl. of oil through ¾-in. choke in 4 hours from pay at 4,458-85 ft., total depth, after acidizing.

**Clay County.**—Continental Oil Co. and Edge Oil Co. 1 Crockett, wildcat east of Buffalo Springs, testing lime zone at 6,490-6,500 ft., after reacidizing swabbed 52 bbl. of oil and 14 bbl. of acid water in 8 hours.

### NORTH TEXAS WILDCAT COMPLETIONS

Archer County: D. H. Bolin 1 D. M. and C. S. Harris, Blk. 76, J. W. Harris Suddivision, 5 mi. W and 2½ mi. S Archer City, elev. 1,069 ft., sand show oil 1,331-51 ft., dry, TD 1,353 ft.

E. P. Griffin and Frank Wood 1 E. P. Griffin, Sec. 8, Palo Pinto PSL A-339, 1½ mi. N Dundee, elev., 1,150 ft., Coleman Junction 538 ft., KWA 4,112 ft., sand 4,462 ft., ran Schlumberger, dry, TD 4,505 ft.

Cooke County: Northern Ordnance Co., Inc., 1 Nennie Adams, Joseph Burden Sur. A-114, 1 mi. W Bloomfield, Ellenburger 2,010 ft., dolomite slight show oil 2,370-75 ft. and 2,415-20 ft., ran jeep, dry, TD 2,685 ft.

Denton County: Northern Ordnance Co., Inc., 1 E. W. Donnald, Geo. M. Dial Sur. A-379, 3 mi. E Pilot Point, elev. 627 ft., dry, TD 3,315 ft.

Hardeman County: Humble Oil & Refining Co. 1 T. F. Reilly, Sec. 48, Blk. 10, H&TC RR. Sur., 3 mi. N, 1 mi. W Chillicothe, elev. 1,407 ft., sand show oil 2,572-86 ft., lime slight show oil 5,754-5,862 ft., ran Schlumberger, dry, TD 6,575 ft.

### WEST CENTRAL TEXAS WILDCAT COMPLETIONS

Jones County: Bell-Oils, Inc. 1 Beaty-Aiken, 444 ft. E, 330 ft. S, Sec. 44, Deaf and Dumb Asylum Lands, lime and water 2,853-3,000 ft., dry, TD 3,560 ft.

Lyons & Prentiss 1 Mrs. Lena Richardson, 330 ft. S and W of S 80-ac. N 160-ac. of middle 768.2-ac. Ambrose-Crain Sur. No. 214, dry, TD 3,512 ft.

Panhandle Refining Co. 1 F. A. Baker, 330 ft. from N and W, Sec. 6, DeWitt CSL, League 125, 2 mi. SW Smith, lime, water, no show of oil or gas 1,640-50 ft., dry, TD 1,970 ft.

# TEXAS GULF COAST

## New Sand Established In Needville Field

HOUSTON.—British-American Oil Producing Co. 1 Hurta, at Needville field, Fort Bend County, failed to show anything on test in perforations from 5,201-08½ ft., evidently failing to get proper penetration. Hole is being reacidized with mud acid and another test will be run. This well had already established a new deeper sand for the field, finding production in perforations from 6,547-52 ft.

D. D. Feldman has located 7 D. D. Feldman (Fountain) as a 6,000-ft. deep test on northerly flank of the old Saratoga dome in Hardin County. It is on 100-acre lease, 330 ft. from north and 910 ft. from west lines of the 100-acre Fountain lease. This is the first deep development for this dome in some time. Norcoff drilled a 6,050-ft. dry hole on east flank of the dome in 1939.

Glenn H. McCarthy et al 4 E. C. Hankamer, on Lot 11, Theo. Koch subdivision in B. A. Vacocu League, Stowell area, Jefferson County, and the deepest test drilled in this area, is going ahead at 12,202 ft., and is thought to be near the top of Vicksburg, already having drilled through the Frio section.

Gulf Oil Corp. 14 C. W. Burrell et al, west offset to its 1-A Craigen, east flank discovery at Fannett in Jefferson County, flowed potential of 217 bbl. a day on 10/64-in. choke, gas-oil ratio 544:1, tubing pressure 950 lb., gravity 35.1°, grace water from perforations, 60 shots, 6,439-49 ft. Total depth 7,050 ft., with 5½-in. casing set at 6,550 ft., and 2⅜-in. at 6,305 ft.

Texas Co. completed 276 Landslide, Robert Dunman Survey, southeast flank Humble dome, Harris County, for a potential of 60.88 bbl. per day on 10/64-in. choke, gas-oil ratio 1,113:1, tubing pressure 350 lb., gravity 48.1°, no water, flowing from 76 perforations at 4,170-90 ft., total depth 4,659 ft., with 7-in. set at 4,375 ft.

American Republics Corp. and Houston Oil Co. of Texas 2 H. & T. C. fee, in Section 189, at Beech Creek field, Hardin County, is shut down after drilling from 9,277-93 ft., total depth in Wilcox. This is a west offset to the 1 H. & T. C., Cockfield discovery. The 2 H. & T. C. fee, had the Cockfield sand showing oil at 6,240-45 ft., but was drilled ahead to test the Wilcox.

### UPPER GULF COAST WILDCAT COMPLETIONS

Fayette County: Seaboard Oil Co. of Delaware 1 Gustav Oeser, J. G. Wilkinson Survey A-108, 2 mi. S of Nechanitz, dry at 5,948 ft.

Jackson County: Butcher-Arthur, Inc., Salt Dome Oil Corp. 1 W. T. Westhoff et ux, W. J. E. Heard League, A-31, dry at 6,812 ft.

Matagorda County: Atlantic Refining Co. 1 Denman estate (Tract C), W. Markham area, Henry Parker Survey, dry at 4,881 ft.

Skelly Oil Co. 1 Schweinle, T. M. Duke Survey, 2 mi. E of Van Vleck, dry at 10,475 ft.

Newton County: H. C. Cockburn 1 Earl Hankamer et al, HT&B Survey, 9 mi. N of Deweyville, dry at 8,509 ft.

Polk County: J. Z. Werby et al 1 Saner-Ragley Lumber Co., Houston County School Land Sur. A-272, 5 mi. SE of Woodlake, dry at 3,908 ft.

## DAILY AVERAGE PRODUCTION FOR WEEK

| | Aug. 5 crude oil | Distillate, allied products | August PAW quota all oils | July 29 crude oil |
|---|---|---|---|---|
| Arkansas | 80,600 | 4,500 | 82,500 | 80,500 |
| California | 849,650 | 51,100 | 917,100 | 854,750 |
| Colorado | 8,650 | ..... | 7,900 | 9,000 |
| Eastern | 62,500 | 6,100 | 77,500 | 62,200 |
| Illinois | 206,500 | 11,500 | 226,500 | 207,000 |
| Indiana | 12,900 | ..... | 14,000 | 13,400 |
| Kansas | 240,400 | 4,300 | 278,300 | 279,250 |
| Kentucky | 25,100 | 2,500 | 25,500 | 24,300 |
| Louisiana | 362,650 | 35,000 | 385,000 | 359,350 |
| North Louisiana | 73,700 | ..... | ..... | 72,350 |
| South Louisiana | 288,950 | ..... | ..... | 287,000 |
| Michigan | 47,700 | 400 | 51,400 | 50,850 |
| Mississippi | 47,100 | ..... | 40,000 | 45,050 |
| Montana | 23,100 | 200 | 24,200 | 21,100 |
| Nebraska | 900 | ..... | 1,000 | 900 |
| New Mexico | 108,300 | 5,500 | 115,500 | 108,500 |
| Oklahoma | 339,100 | 27,000 | 359,000 | 339,500 |
| Texas | 2,108,600 | 138,000 | 2,237,000 | 2,067,300 |
| East Texas | 371,700 | ..... | ..... | 363,550 |
| East Central Texas | 147,650 | ..... | ..... | 148,300 |
| North Central Texas | 148,750 | ..... | ..... | 151,600 |
| Texas Panhandle | 98,700 | ..... | ..... | 89,150 |
| West Texas | 484,950 | ..... | ..... | 463,550 |
| South Central (San Antonio) | 19,300 | ..... | ..... | 19,700 |
| South Texas (Laredo) | 77,400 | ..... | ..... | 78,200 |
| Lower Gulf Coast | 224,950 | ..... | ..... | 221,850 |
| Upper Gulf Coast | 535,200 | ..... | ..... | 531,400 |
| Wyoming | 92,650 | 3,000 | 103,000 | 93,900 |
| Total United States | 4,616,400 | 289,100 | 4,945,400 | 4,617,450 |
| Total production January 1-August 5, 1944 | | | | 975,400,750 bbl. |
| Same period last year | | | | 865,880,875 bbl. |

# SOUTH LOUISIANA

## New Gas-Condensate Producer in Vacherie Area

NEW ORLEANS.—A new gas-condensate producer for the Vacherie area of St. James Parish, is Humble Oil & Refining Co. 1 St. Joseph Planting & Manufacturing Co., in 12-12s-17e. Completion was effected in perforations at 9,126-36 ft., and the well flowed 2.92 bbl. condensate per hour, 82,000 cu. ft. gas, through ¼-in. choke, tubing pressure 2,300 lb., with high gas-oil ratio and is shut in. Hole had been drilled to a depth of 10,765 ft. before plugging back for completion, and the 5½-in. casing is set at 9,210 ft.

Union Oil Co. of California is conditioning mud and preparing to set casing in the 2-A State-West White Lake, Vermilion Parish, total depth 10,750 ft. The discovery well, 1-A State, completed late last year, made a gas well in perforations from 10,660-675 ft., some condensate, dual-completed as a dry gas well in perforations 8,356-75 ft.

Pure Oil Co. 1 General American Transportation Corp., wildcat in 7-12s-8e, Good Hope area of St. Charles Parish, is standing waiting on cement to set with 5½-in.

A prominent aviation manufacturer used a Laughlin Safety Hook, as shown, as part of a riveting machine set-up purposely devised for the safety and efficiency of women war workers.

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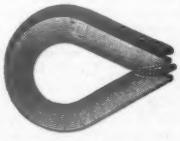

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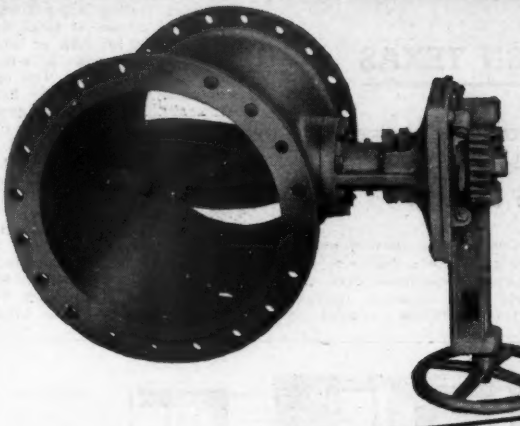


**No. 618.** Special heavy-duty welded steel body unit with "H" metal vane. Heavy-duty hand wheel control for operation at 150 psi.

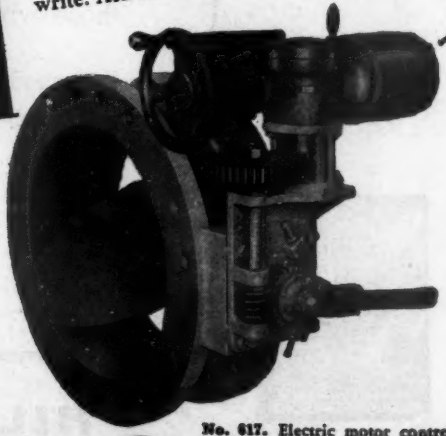
# LOW HEAD LOSS SAVES POWER!

All R-S Butterfly Valves have streamlined vanes which offer minimum flow resistance. Flow conditions are similar to those produced in a venturi tube with high pressure recovery on the downstream side. Such a low head loss means a considerable saving in power particularly in large pumping operations.

Furthermore, there are no pockets, right-angle bends or reverse turns to collect sediment. When the vane approaches a closed position, the valve *tends to clean itself.*

Shut-off is accomplished by the beveled vane which wedges against the valve body. *Remember that four to six revolutions of the hand wheel completely open or close the valve vane.* Easily adapted to power operation.

If you are interested in a simplified and less costly method of control and shut-off, write. Ask for Catalog No. 14-B.



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Control and shut-off of volume and pressure for air, gas, steam, liquids and semi-solids.

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**R-S Streamlined BUTTERFLY VALVES**

casing set at 7,919 ft. Total depth is 10,171 ft. Several sands were reported in this test indicating possible production.

## EASTERN TEXAS

### Additional Smackover Lime Wildcats Forecast In Bowie County

DALLAS.—Considerable leasing and royalty trading forecasts the early drilling of additional Smackover lime wildcats in Bowie and adjacent northeast Texas counties centering around the Bowie County discovery producer of Barnsdall Oil Co. and Sohio 2 Heilbron, just southwest of Texarkana. This well continues testing after first showing for a big wet gasser at total depth 7,701 ft., then flowing 165 bbl. of 40.3°-gravity oil in 24 hours through 3/16-in. choke after deepening to 7,716 ft. The operators were preparing to deepen the hole 10 ft. and test again. The following geological markers have been established from the electrical log: Goodland 2,922 ft., Paluxy 3,078 ft., upper Glen Rose 4,182 ft., Massive anhydrite 4,510-4,625 ft., James 5,030-77 ft., Travis Peak 5,340 ft., Cotton Valley 6,266 ft., Buckner 7,455 ft., Smackover lime 7,658 ft., top of porosity 7,669 ft.

**Wood County.**—Sun Oil Co.-Shell Oil Co., Inc. 1 Herring-Scoggin, James Polk Survey, on the west flank of the Manziel field, after plugging back to 8,772 ft. in the Rodessa zone from total depth 9,301 ft., flowed 500,000 cu. ft. of gas with 2 bbl. of distillate and some wash water in 24 hours, continued testing.

**Shelby County.**—Ce-Beth Oil Co. 1 Smith, wildcat 5 miles north of Center in the McKelvey Survey, at total depth 5,560 ft., couldn't get electrical logging instrument below 5,425 ft. on first run and is rerunning it. It had base of Massive anhydrite at 5,378 ft. and topped first porosity at 5,420 ft.

**EAST TEXAS WILDCAT COMPLETION**

Fannin County: Damon Oil Co. 1 A. L. Chaffin, 1,000 ft. from N, 1,008 ft. from E, 85-ac. tr., Jacob Ketchum Sur., Glenrose 2,125 ft., Paleozoic 3,115 ft., dry, TD 3,223 ft.

## ROCKY MOUNTAIN

### Montana Test Gets Gas East of Kevin-Sunburst

DENVER.—The Texas Co., in a search for a new pool on a 30,000-acre East Utopia block, east of the Kevin-Sunburst field, Liberty County, Montana, had a flow of 8,000,000 cu. ft. a day of sweet gas at 2,301 ft., probably in the base of the Ellis, and set the 7-in. at 2,393 ft. for a shutoff before drilling into the top of the Madison. The wildcat is approximately a mile east of a discovery made last November in its 1 State, 16-33n-4e, which had the top of the Madison at 2,578 ft. and was rated at 20 bbl. per day.

**Kicking Horse wildcat kicks again.**—Husky Refining Co. 1 Rankin, NW SE SE 8-36n-1e, northwest of the Kevin-Sunburst field, which had 848,000 cu. ft. of gas at 930 ft., topped the Kootenai at 1,460 ft., and at 2,040 ft., believed to be on top of the Madison, had a show of black oil on the tools. Tools were run to drill a little deeper. Before any new hole was made, tools were blown up the hole 300 ft. where they lodged. Fishing is in progress.

**Edge well at Elk Basin a producer.**—Carter Oil Co. 1 Johnson, NE NE SE 6-57n-99w, ½ mile south of nearest production in the Tensleep in Elk Basin, and a doubtful edge well, has been completed flowing 70 bbl. of oil per day. Total depth is 5,963 ft., 7-in. at 5,712 ft., top of Tensleep at 4,214 ft.

**Torchlight lease sale.**—Bids opened in the office of the Secretary of the Interior on July 10 disclosed that the Mule Creek Oil Co. (Carter) was high bidder at $25.60 an acre on three tracts of government land comprising 445 acres in Sections 24 and 25-51n-93w and 30-51n-92w, Big Horn County, in the old Torchlight field in the Big Horn basin. Phillips Petroleum Co. was second high bidder at $25.26 an acre.

Interest in the sale indicates that plans are being considered for a deep test. The first commercial well was completed in 24-51n-93w in 1913. Afterwards some 130 wells were drilled to sandy zones in the Mowry shale at 300 to 600 ft. in depth. A test to the Madison located 200 ft. down structure reached that horizon at 3,870 ft., had 50 ft. of oil-saturated lime at 4,000-50 ft., which was drown out by a flood of water just above the bottom at 4,165 ft. The field was virtually abandoned in 1938.

**Cooper Cove second well.**—Stanolind Oil & Gas Co. 1 Union Pacific, NE SE NE 19-18n-77w, Cooper Cove structure, Carbon County, Wyoming, topped the Dakota at 4,913 ft. which showed some water on a drill-stem test. It was then plugged back to 3,950 ft., where whipstock was set and redrilling commenced. Location is ¾ mile northwest of the discovery which swabbed 262 bbl. in 20 hours from the Dakota.

**Development at Clark's Lake.**—Amerada

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Petroleum Corp. has completed its third well in the Clark's Lake field, northern Colorado, and is starting its fourth. Last completion was 1 North Poudre Irrigation Unit, a northeast offset to the discovery. It made 186 bbl. in 24 hours from the Muddy sand on the pump. The fourth well, 1 Nichols, is a northwest offset to the latest completion.

**WYOMING WILDCAT COMPLETIONS**

Two Bar, Natrona County: Pacific Western Oil 1 Government, SW NE SW 24-31n-81w, dry, TD 4,047 ft., Tensleep 3,331 ft., Madison 3,843 ft.

Midway, Pondera County: Hageman-Pond 4, Rispen, NE SE NW 20-28n-1w, dry, TD 1,793 ft., Sunburst 1,772-91 ft.

# PERMIAN BASIN

## Exploration Campaign in Solid, Aggressive Phase

MIDLAND.—West Texas major and independent operators have staked new wildcat and extension locations in widely scattered counties throughout the district. Despite the handicaps of shortages of material and manpower, the exploration campaign in West Texas, including the northern Plains and Edwards Plateau areas, seems now to be in a solid, aggressive phase which week by week is forming the foundation for a tremendous oil and gas development program in the post-war period.

New tests reported last week include: In Lubbock County, Magnolia Petroleum Co. 1 L. D. Johnson, in NE NE of Section 88, Block C, D&WCRR Survey, to be drilled to a depth of 8,000 ft. Location is about 6 miles northeast of Stanolind Oil & Gas Co. 1 Stinnett, a small oil producer. In northwestern Dawson County, Richmond Drilling Co. has staked location for J. W. Nelson et al, 1,980 ft. from north and 660 ft. from west lines, Section 34, Block M, ELRR Survey. Sun Oil Co. announced location for a 10,500-ft. Ordovician test at 1 M. H. Martin, in SE SE of Section 17, Block A-41, PSL Survey, in the southwest part of Andrews County.

In Upton County, Texas Pacific Coal & Oil Co. 1-A Morrison was staked 467 ft. out NE corner Section 29, C&MRR Survey, a scheduled 4,000-ft. cable-tool wildcat about 12 miles west of closest production in the Big Lake field, Reagan County. In Mitchell County, Hickok and Reynolds staked 1 T. L. McKenny in the SE¼ of Section 30, Blk. 28, T-1n, T&PRR Survey, for a 3,500-ft. wildcat about a mile west of production in the Westbrook field.

In the Edwards Plateau country, Kerr County, Humble Oil & Refining Co. announced location for 1 W. R. Schreiner, a 7,000-ft. wildcat, 660 ft. from northeast and 1,980 ft. from southeast lines of Section 13, Abstract 82, BS&F Survey. Shell Oil Co., Inc., 1 Honeycutt, recently started a 7,500-ft. wildcat in Edwards County, and has cemented surface pipe at 1,225 ft.

Frankel Brothers 1-D University, 1½-mile east extension to the Fullerton field, Andrews County, gaged 1,514.80 bbl. oil per day on completion test from total depth 6,980 ft. Phillips Petroleum Co. staked locations for four tests on its west offset 160-acre lease to the Frankel producer. In the Crossett pool, southern Crane County, Texas Co. 1-B Hobbs swabbed and flowed 48 bbl. oil in 11 hours, after acidizing lime pay at 5,331-91 ft., total depth, with 2,000 gal. of acid. Same operator's 1-A Hobb, discovery well in the pool, flowed 60 bbl. of oil in 1 hour and 50 minutes from separate pay zones opposite perforations at 5,670-85 ft., 5,300-50 ft., and 5,365-90 ft. A southwestern Cochran County wildcat, Al G. Hill et al 1 Sherrill, topped porosity in the big lime at 4,948 ft. and was coring past 4,971 ft., in lime with slight porosity and bleeding oil and gas in streaks.

Standard Oil Co. of Texas 2 McDer, Pecos County, showed 3,000,000 cu. ft. of gas, natural, and a slight amount of distillate from perforations at 4,900-5,130, 5,090-5,106, 5,124-30, and 5,140-66 ft. After treating with acid, it blew 200 ft. of tubing out of the hole, caught fire and is reported to have fatally injured part of the crew. It was successfully shut in.

**WEST TEXAS WILDCAT COMPLETIONS**

Culberson County: O. C. Woods 1 J. O. Barfield, 660 ft. S, 1,980 ft. E, Sec. 17, Blk. 82, PSL, dry, temporarily abandoned, TD 575 ft.

Dickens County: Geo. P. Livermore, Inc. 1 C. D. Byrd, 660 ft. from N, 1,980 ft. from E, Sec. 228, Blk. 1, H&GN Sur., Yates 1,060 ft., San Andres 1,540 ft., dry, temporarily abandoned, TD 2,602 ft.

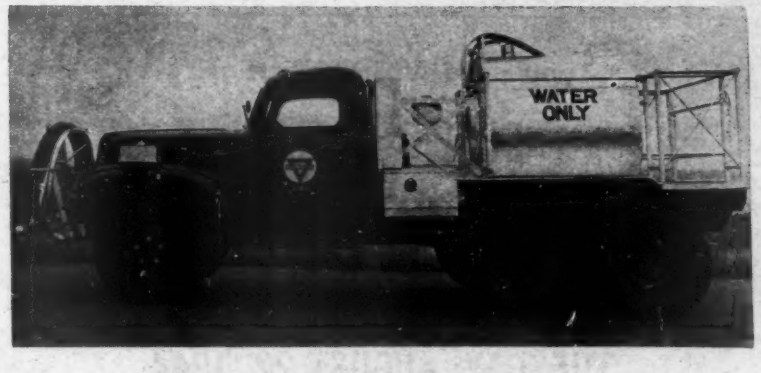
Hockley County: Stanolind Oil & Gas 1 Nellie DeLoache, 660 ft. N and W, Labor 19, League 80, Reeves CSL, San Andres 3,670 ft., Glorietta 5,020 ft., dry, TD 6,510 ft.

McCullough County: Homer Easterwood 2 W. C. Johnson, Lot 1,355, A. Neuendorf Sur., 3½ mi. N Melvin, dry, temporarily abandoned, TD 1,836 ft.

C. M. Joiner Leasing 1 Lawson, Hohnman Sur., 1,093, A-563, 22 mi. NW Brady, dry, temporarily abandoned, TD 1,533 ft.

Pecos County: Atkins & Pittman 1 Ben C. Shera, 330 ft. from S, 3,083 ft. from E, Sec. 10, Blk. 110, TCRR Sur., slight show oil and gas 1,162 ft., dry, TD 1,681 ft.

James T. Brewer 1 F. A. Perry, 1,650 ft. from N and W, Sec. 13, Blk. 194,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GC&SF Sur., elev. 2,940 ft., show oil 1,843 ft., shot 50 qt. 1,843-1,920 ft., IP 168 bbl. day, TD 1,920 ft.

Culberson & Irwin 1 O. L. Barnes, 660 ft. from SE and NE, Sec. 134, Blk. 10, H&GN Sur., anhydrite 440 ft., Yates 940 ft., San Andres 1,935 ft., Ellenburger 4,385 ft., dry, TD 4,452 ft.

Ungren & Frazier 1 Nutt, 2,310 ft. from N, 330 ft. from E, Sec. 17, Blk. 125, T&St.L. RR Sur., dry, temporarily abandoned, TD 2,440 ft.

Reagan County: Superior and Wiggins & Hyde 1-B University, 330 ft. from S and E, Sec. 12, Blk. 1, University Land, dry, TD 4,530 ft.

Val Verde County: John Cockburn 1 I. F. Ingram, Sec. 42, Blk. LLL, GC&SF Sur., 8 mi. NE Langtry, dry, TD 1,826 ft.

### PANHANDLE

AMARILLO.—Pure Oil Co. 1 Sneed, Dallam County wildcat, filled 1,200 ft. with salt water with no shows of oil or gas after perforating casing at 5,146-54 ft., and 5,120-34 ft. in lime. Operators set a bridge in casing at 4,930 ft. to test further. In Oldham County, Stanolind Oil & Gas Co. 1 Herring was drilling past 6,160 ft. in lime with no shows of oil or gas reported.

### PANHANDLE WILDCAT COMPLETION

Hutchinson County: Humble Oil & Refining Co. 1 Lasater, Sec. 2, M. Frederick Sur., 2 mi. N Stinnett, elev. 3,310 ft., dry, TD 3,320 ft.

### SOUTHEAST NEW MEXICO WILDCAT COMPLETIONS

Eddy County: Southern Union Gas Co. 1 State, 1,650 ft. from S, 2,310 ft. from W, Sec. 21-17s-28e, 400,00, cu. ft. gas, PD, sandy lime, show oil 1,953-63 ft., shot 90 qt. 1,946-2,033 ft., IP 45 bbl. day, TD 2,033 ft.

Lea County: DeKalb Agricultural Association 1 Magnolia-Stovall, 1,980 ft. from S and W, Sec. 8-20s-32e, IP est. 2 to 3 MCFG PD, anhydrite 1,510 ft., TD 7,955 ft.


## Tennessee Valley Authority

# PUBLIC AUCTION

# ELECTRICAL AND MECHANICAL MATERIALS

(new and used)

Starting

## TUESDAY, AUGUST 22, 1944

## 10 A. M. (CWT)

Report to Nitrate Plant No. 2
Sheffield, Alabama (Muscle Shoals)

Material to be auctioned consists of:

| | | |
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| Bolts | Miscellaneous Construction Materials | Insulators |
| Nuts | Conduits | Reflectors |
| Screws | Couplings | Key Steel |
| Washers | Electric Wire and Cable | Hand Tools |
| Conduit | Safety Switches | Ratchets |
| Fuses | Couplings, Steel and Cast Iron | Reamers |
| Pipe | Grease and Oil Cups | Stocks |
| Valves | Threading Dies | Taps |
| Paint | Twist Drills | Tongs |
| Sheaves | Wrench Parts | Wrenches |
| Packing | Motor Brushes | Fittings, etc. |
| Belting | Grinding and Buffing Wheels | |

The above equipment will be sold in accordance with War Production Board and Office of Price Administration regulations, and free from all incumbrances. Payment shall be made within 10 days from date of sale by cashier's or certified check, payable to the Tennessee Valley Authority. Material may be removed immediately upon payment and must be removed within 30 days from date of sale.

The Authority reserves the right to withdraw any item or items from sale before the auction is complete in the event the amount bid on such item or items is inadequate in the judgment of the Authority.

Material may be inspected on any weekday, between 8:00 A. M. and 3:00 P. M. See Ralph Mitchell or R. B. Stitzer, U. S. Nitrate Plant No. 2, Wilson Dam, Alabama.

For further information, write the Sales Section, Tennessee Valley Authority, Old Post Office Building, Knoxville, Tennessee.

TENNESSEE VALLEY AUTHORITY
W. J. Hagan, Jr.
Director, Materials Department


# ILLINOIS

## Week's Largest Completion In Lancaster Pool

CENTRALIA.—The Lancaster pool in Wabash and Lawrence counties supplied the largest completion of the week in Illinois. G. H. Schrack and Trumbull Asphalt Co. 1 Foster, SW SE SE 4-1n-13w, Wabash County, flowed 1,350 bbl. the first 24 hours following an acid treatment of Levias lime, at 2,667-74 ft., total depth 2,697 ft. It is the largest initial producer thus far in this pool. The well is a quarter-mile southeast of the town of Lancaster.

The largest Aux Vases sand producer yet found in the Burnt Prairie pool in White County is Ben Nation 1 Pollard, NE NW NE 28-3s-9e, 2 miles southeast of the town of Burnt Prairie, which flowed 581 bbl. of oil in 24 hours from sand at 3,238-72 ft., total depth 3,283 ft.

A very promising wildcat 6 miles northwest of Mount Vernon, Jefferson County, is A. A. Cameron 1 Bizot, NE NE NW fractional section 30-1s-2e, which was showing good saturation in Benoist sand at 2,054-62 ft., total depth. On a 40-minute drill-stem test, 396 ft. of clean oil, 176 ft. of oil-cut mud and no water were indicated. The test is 2½ miles from other production.

Of the 40 new operations started in the past week only 6 were wildcats, in 6 counties as follows: Great Lakes 1 L. H. Tully, SW NW SW 7-7s-10e, White County; Pure Oil 1 E. V. Chaffin, C SW SW SW 1-2n-8e, Clay County; Amsco 1 W. M. Daubs, SW SE SW 35-2n-8e, Wayne County; J. W. Rudy et al 1 Clark, NW NW SW 32-3s-5e, Hamilton County; P. L. Rea 1 M. Banaszek, SE NW NE 27-3s-2w, Washington County; Joe Kisl 1 Whitmore heirs, C SW SW 25-5n-6w.

### ILLINOIS WILDCAT COMPLETIONS

Clay County: D. Duncan et al 1 R. McGill, NW SW SE 24-5n-6e, dry at 2,960 ft., Menard 2,132 ft., Cypress 2,555 ft., Aux Vases 2,752 ft. McClosky 2,854 ft., St. Louis 2,918 ft.

Edwards County: George H. Wickham 1 Schroeder, NW NE SE 27-2s-14w, McClosky pay at 2,994-2,998 ft., TD 3,004 ft., but PB to 2,998 ft. Acidized. Pumped 55 bbl. oil and 100 bbl. water.

Phillips Petroleum Co. 1 Broster, SW NW SE 6-3s-10e, dry at 3,379 ft. Menard 2,433 ft., Cypress 2,936 ft., Aux Vases 3,197 ft., Fredonia 3,313 ft.

Effingham County: Kingwood et al 1 O. H. Schwartz, SW NW SW 23-6n-7e, dry at 3,073 ft., Kincaid 2,033 ft., Weiler 2,655 ft. Benoist 2,752 ft., Aux Vases 2,820 ft., Fredonia 2,914 ft., McClosky 2,927 ft., St. Louis 3,058 ft.

Magnolia 1 F. Rieman, SE SW SE 2-7n-6e, dry at 2,650 ft., Glen Dean 2,067 ft., Cypress 2,241 ft., Benoist 2,399 ft., Aux Vases 2,458 ft., McClosky 2,565 ft.

Franklin County: Freeman Coal Corp. 1 Browning, NE NW NE 8-8s-2e, dry at 1,979 ft. Upper Kincaid 1,317 ft., Tar Springs 1,928 ft., Upper Glen Dean 1,965 ft.

Jasper County: Texas 1 J. R. Kittle, SW SE SE 3-5n-9e, dry at 3,182 ft. Glen Dean 2,501 ft., Cypress 2,710 ft., Aux Vases 2,986 ft., McClosky 3,069 ft.

Jefferson County: Neal Thompson 1 V. E. Steffan, SE SE NE 30-3s-4e, dry at 3,284 ft., Menard 2,257 ft., Cypress 2,765 ft., Benoist 2,972 ft., Ste. Genevieve 3,070 ft., McClosky 3,155 ft.

Lawrence County: Smith & Nye 1 Buchanan, SE SE NW 13-2n-12w, dry at

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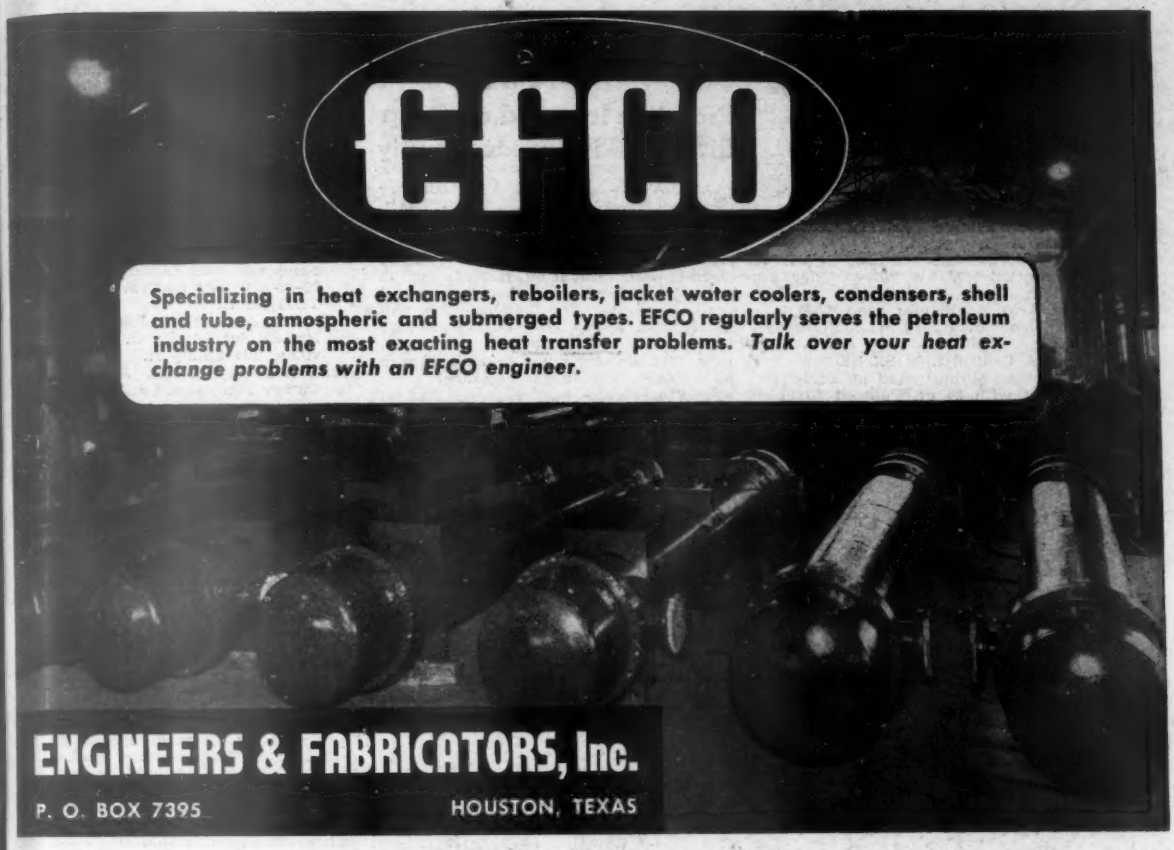

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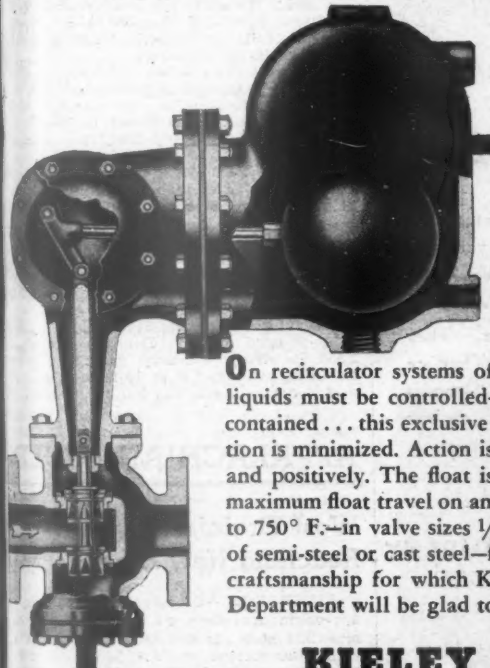

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1,967 ft., Barlow lime 1,630 ft., Cypress 1,685 ft., Benoist 1,771 ft., McClosky 1,946 ft.

Madison County: George Cassens 1 Isenberg, SW SW NW 13-6n-8w, dry at 1,360 ft., Ste. Genevieve lime 546 ft., Devonian 1,354 ft.

Wayne County: Pure 1 P. Atterberry, SE NW SE 14-1n-7e, dry at 3,165 ft., Lower Menard 2,336 ft., Cypress 2,754 ft., Aux Vases 3,015 ft., Ste. Genevieve 3,083 ft., Fredonia 3,128 ft., McClosky 3,128 ft.

White County: J. H. Williams 1 North Storms, NE NW SW 2-6s-10e, dry at 3,149 ft., Upper Kincaid 1,865 ft., Benoist 2,808 ft., Benoist sand 2,830 ft., Ste. Genevieve 2,991 ft., McClosky 3,038 ft.

Sohio 1-A Central Life, SE NE NW 10-7s-10e, Tar Springs sand at 2,179-83½ ft., shot with 20 qt. Pumped 40 bbl. in 24 hours.

## MICHIGAN

### Proration Imposed on Deep River Field, Arenac County

SAGINAW.—Accepting oil advisory board recommendations, P. J. Hoffmaster, state supervisor of wells, has imposed production proration on the Deep River oil field in Arenac County, where several wells producing initially up to 200 bbl. an hour have been developed in recent months. The limit probably will be 200 bbl. a day on wells on 20-acre lease units, 500 bbl. a day on 40-acre units. The advisory board's stand is based on a steady drop in gas pressure.

Field operations last week resulted in nine completions featured by the 800-bbl. Socony-Vacuum Oil Co. well in Home Township, Montcalm County, and the Sun Oil Co. well in Norwich, Missaukee County, which flowed 810 bbl. in 8 hours after being acidized. Four of the five dry holes were wildcat tests.

A dozen more drilling permits were issued by the state conservation department, two each going to Allegan, Bay, Isabella and Van Buren counties, the others to Calhoun, Newaygo, Ottawa and Montcalm counties.

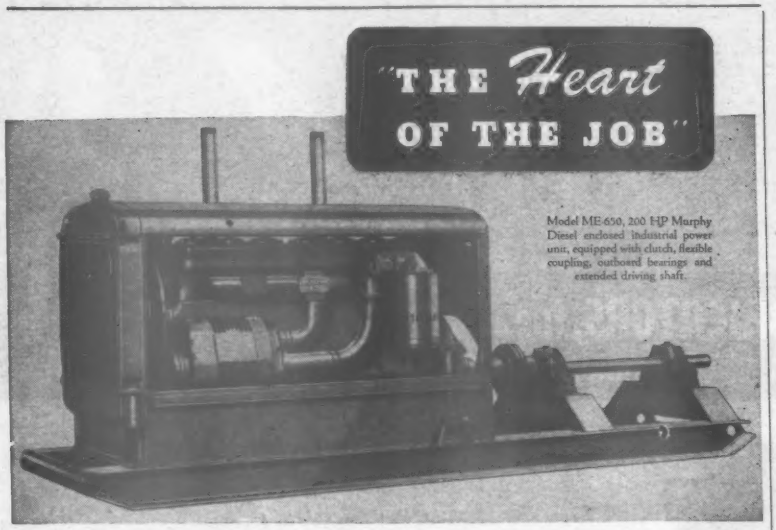
**MICHIGAN WILDCAT COMPLETIONS**

Allegan County, Fillmore Township: J. W. Lang Co. 1 B. Agieres, SE NE NE 23-4n-15w, dry in Traverse limestone, TD 1,638 ft.

Clifford A. Perry 4 John Pieper, NW NW SE Sec. 30, dry in Traverse limestone, TD 1,515½ ft.

Gratiot County, North Star Township: Turner Petroleum Co. 1 Tony Smolka, C S½ NE SW 26-10n-2w, dry in Monroe, TD 3,146 ft.

Mecosta County, Green Township: Allegan Pipe & Supply Co. 1 Consumers Power Co., SE SE NW 10-16n-10w, dry in Monroe, TD 3,561 ft.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## CANADIAN FIELDS

### N. Turner Valley Outpost Looks Promising

CHATHAM.—British Dominion 6, LSD 6, 17-21-3w5, an outpost well in North Turner Valley, finished at 10,238 ft. after drilling two Madison lime blocks below the first contact at 7,910 ft., with 253 and 170 ft. of porosity respectively. Faulting accounted for the lime repetition. Production tests are starting. Other wells testing are Foothills 17, LSD 3, 27-20-3w5, at 7,954 ft., with lime at 7,440 ft. making 175 bbl.; Royalite 75, LSD 6, 2-20-3w5, Madison 8,290-8,357 ft., 300 bbl.; Home Oil 19, LSD 1, 5-21-3w5, Madison 8,041-8,485 ft., large producer.

**Southwest Extension.**—Turner Valley southwest extension is getting a thorough test. In addition to the wells now drilling, Major Consolidated 17 has been spotted in LSD 13, 4-18-2w5, Major 18 in LSD 14, 33-17-2w5, and Federated Petroleum 1 in LSD 16, 5-18-2w5. The new drilling will extend about 7 miles southeast of the most southerly production.

**Conrad.**—In the Taber-Conrad area, southeast of the Taber field, Imperial-British Dominion 2, LSD 4, 7-8-15w4, is swabbing about 25 bbl. daily of 20° gravity crude from the Taber sand at 3,171-78 ft.

**Steveville.**—Princess-Steveville 2, LSD 2, 14-20-11w4, on the Denhart Dome at 2,850 ft. struck a heavy gas flow, with naphtha, estimated 8 to 10 million cu. ft. and is deepening to the Sunburst sand.

## APPALACHIAN FIELD

### West Virginia Activity Reaching New High

PITTSBURGH.—Of interest to Pennsylvania operators, as the axis extends into this state, is the test of Texas Co. which has started on E. A. Mizer farm in Stock Township, Harrison County, Ohio, and scheduled for the Clinton sand. It is northwest of Cadiz and starts at an elevation of 921 ft.

Activity in West Virginia is reaching a new high with 230 wells under way at present and 91 in southwest Pennsylvania with much more work planned. Some wildcatting in Logan and Wyoming

counties, West Virginia, appears promising. Since the decline of the Oriskany fields in Kanawha and Jackson counties, drilling has again reverted to proven acreage in Loudin, Malden, Big Sandy and Cabin Creek districts in Kanawha County and much new work in Lincoln and Wayne counties. Occasional good wells are struck in those areas as this week's completion of Owens Libby Owens 34 Wilson Coal Land Co. in Lincoln district, Wayne County, gaging 1,400,000 cu. ft. from the Brown shale, total depth 2,981 ft. In the same district, United Fuel Gas Co. completed 5,433 J. L. Caldwell good for 762,000 cu. ft. gas from Brown shale, total depth 2,970 ft.

In Clay County, Pittsburgh and West Virginia Gas Co. completed 7,993 Elk River C. & L. Co. in Buffalo district in the Big Injun and good for 717,000 cu. ft. gas, total depth 2,380 ft. Their wildcat on the William Cunningham farm in Otter district was a failure with Big Lime 1,931 ft. Injun 2,020 ft., Squaw 2,104-15 ft., total depth 2,167 ft.

## CALIFORNIA

### Ohio Extends Limits of Paloma Distillate Field

LOS ANGELES.—Ohio Oil Co. extended the northwestern limits of the Paloma distillate field several days ago by completing 11-A Kern County Land in 32-21s-19e flowing 750 bbl. of 50°-gravity condensate and 2,500,000 cu. ft. of gas daily from the Paloma zone of Miocene age with bottom of the hole at 10,803 ft. This outpost is located almost 1 mile west of an extension well finished over a year ago by General Petroleum Corp. and now included in the Paloma unit plan. Completion of Ohio's outpost well will necessitate an extension of the Paloma unit plan acreage provided the well remains on production for a period of 30 days unless the unit operators decide to dispense with the production test. Ohio's new well proves up the northwest quarter of 33-31s-26e and possibly the northeast quarter of 32-31s-26e.

Because of its proximity to the southeast corner of 29-31s-26e, it is likely Pacific Western Oil Corp. may undertake development on its fee acreage. Since Hancock Oil Co. and General Petroleum Corp. hold adjacent acreage the projected well may be a joint undertaking and located where it will bring in the most acreage in the event it is completed as a commercial producer. General Petroleum has already started work on an outpost to be drilled on the Benson property.

Standard Oil Co. of California's 6-H Perry Anderson in the Rio Vista gas field which discovered a new gas sand last week, recovered salt water on a formation test at 5,805-56 ft. along with a high gas blow and accordingly landed a string of 5½-in. at 5,855 ft. Subsequently this solid string was gun perforated and the well will be on production within the next few days.

The result of Pacific Western's 26 Los Alamos in the Cat Canyon district of Santa Barbara County indicates the possibility the edge of the Miocene accumulation may not be far away as this well was only good for 104 bbl. of 15.6°-gravity oil cutting 40 per cent from 5,800 ft. The initial is much smaller than usual and the cut is quite high. General Petroleum added another new well to its list in the Rincon field and has spudded in another. This directional drilling is being done from the company's Rincon-Ferguson pier.

Drilling operations continue at an aggressive rate in the Buena Vista Hills field where Standard discovered a new productive zone in the Pliocene several months ago and a further expansion may be anticipated. In 21-31s-23e, however, Standard appears to have missed the new zone which means the productive limits are defined in this direction. In 29-31s-23e also, Standard appears to have missed the zone and thus the western limits of production and the northwestern limits have been marked. The well in Section 21 is 378-21-B and the outpost in Section 29 is 83-29-B. The former is still drilling and the latter is plugging back to the Calitroleum zone from which good production can be expected although not as large as would be secured from the new zone.

**CALIFORNIA WILDCAT COMPLETIONS**

Alpaugh wildcat district, Kings County: Standard 1 von Glahn Unit, 34-23s-22e, dry in gray sand, no showings logged, TD 4,613 ft.

Costa Mesa wildcat district, Orange County: Lovelady & Frambes 1 Destiny, 9-6s-10w, abandoned in gray sand, objective tar sand absent, logged only a few colors, TD 1,812 ft.

Ducor wildcat district, Tulare County: L. B. Tannehill 1 Ducor, 22-23s-27e, dry in basement schist, no showings of any kind, TD 1,680 ft.

Rosedale wildcat district, Kern County: Western Gulf, 37-14 Kern County Land, 14-29s-26e, dry in hard barren gray sand, practically no showings, TD 10,761 ft.

Tehama wildcat district, Tehama County: Richfield 1-A Gallatin, 26-25n-3w, dry, only minor gas showings, TD 4,100 ft.

Truckhaven wildcat district, Imperial County: Pure 1 Truckhaven Unit, 26-10s-9e, dry in basement granite, top basal conglomerate 5,800 ft., practically no showings, TD 6,100 ft.

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## SOUTHWEST TEXAS

### Second Victoria Test Still Swabbing in Perforations

CORPUS CHRISTI.—Second test in Victoria area, George W. Strake 2 Tom O'Connor, Jr. et al, in IRR Survey, Section 27, northeast of the 1 O'Connor, discovery pumper southeast of Telferner, Victoria County, is still swabbing in perforations from 2,802-12 ft., after making squeeze job at 2,812-14 ft. to shut off salt water which appeared on first test at 2,802-12 ft. It is now swabbing fresh water with some oil. The discovery well, 1 O'Connor, which was completed pumping about 35 bbl. per day, is now making some salt water and amount of fluid has decreased considerably.

Humble Oil & Refining Co. 3 E. J. Pruitt et ux, in the Antonio Estrada Survey, Abstract 224, Section 53, southwest of Charlotte in Atascosa County, ran drill-stem test at total depth 6,923 ft. in Edwards lime which recovered 265 ft. of pipe-line oil and 45 ft. of oil-cut mud. Operators now are preparing to run 5½-in. casing.

In Cabeza Creek field, Goliad County, Continental Oil Co. 2 Pettus, in D. M. J. Ybarbo Survey, plugged back from total depth 8,558 ft. and ran a drill-stem test from 7,735½-50 ft., using ¼-in. chokes, and 4,000-ft. water cushion, developed faint blow, recovered 120 ft. of gas-cut mud in 20 minutes, no bottom-hole pressures recorded. The well is now shut down for orders.

South Eagle Hill is the name given by the Oil Field Nomenclature Committee of the South Texas Geological Society to the field discovered by Harvey & Henderson 1 J. F. Welder heirs, in S. Alexander Survey 102, Duval County.

**SOUTHWEST TEXAS WILDCAT COMPLETIONS**

Bee County: W. Earl Rowe 1 Harry Schultz, A. B. Dickson A-159 and J. M. Reed A-481 Surveys, 8 mi. W of Skidmore, dry at 4,541 ft.

Bexar County: J. A. Caldwell 1 Jessie Conaway, J. H. Lucas Survey 54, 9 mi. SE of San Antonio, dry at 580 ft.

Duval County: J. W. Gorman 3 A Herbst. H&GN Survey 71, 9 mi. E of Freer, dry at 2,834 ft.

Hewit & Dougherty 1 Dowell Co., J. Poitevent Survey 394, dry at 5,200 ft.

Frank J. Gravis 1 Puig, 1 mi. E of North Sweden field 330 ft. out of southwest corner of 400-acre tract, total depth 4,022 ft., PT 2,500,000 cu. ft. gas and 1 bbl. of condensate daily.

Frank J. Gravis 1 Vaello heirs, "San Andres" A. Garcia Grant, A-657, 3 mi. SE of Benavides and east of Benavides field, dry at 4,100 ft.

Gonzales County: Maguire Industries, Inc. 1 Valenta, John McClure Survey, 7½ mi. NE of Pilgrim, dry at 2,513 ft.

Guadalupe County: Wiegand Bros. 1 Paul and Emma Baumert, Matthew Besore Survey, 2 mi. S of Kingsbury, dry at 2,550 ft.

Jim Wells County: Sun Oil Co. 13-A T. T. East, East area, Santo Domingo De Arriba Grant, dry at 4,756 ft.

Live Oak County: Smith & Story, Inc. 1 W. H. Kline, John McMullen Grant, 6 mi. N of Mathis, dry at 3,050 ft.

Victoria County: G. W. Strake 1 Tom O'Connor, Jr., et al I.R.R. Co. Sur. 27, about 3,000 ft. southeast of Telferner field, total depth 4,537 ft., perforated 2,834-38 ft., PT 36 bbl. day pumping.

Zapata County: Wise & Fallis 1 Fernando Cuellar, Survey 285, 2 mi. SE of Escobas, dry at 177 ft.

## KANSAS

### 15 Wildcats Included in 44 New Operations

THERE were 30 completions in Kansas this week, of which 14 were oil wells and 16 were dry. Seven wildcats, all dry, were completed. New operations started far exceeded completions, there being 44 new wells announced, among which were 15 wildcat starts. The wildcat starts were scattered over the state, Barton, Ottawa and Sedgwick counties getting 2 each, while Barber, Butler, Edwards, Ellis, Greenwood, McPherson, Norton, Osborne and Stafford counties each had one.

**Barton County.**—In the Ainsworth pool, Hendon Drilling Co. 1 Schreiber, SW SE NE 32-16-13w, was the best completion of the week for the state, drawing the maximum potential of 3,000 bbl. from Arbuckle pay at 3,343-47 ft.

**Stafford County.**—In the Mueller pool, Virginia Drilling Co. 3 Tieperman "A," S/2 NE SW 29-21-12w, was completed for a 2,062-bbl. potential from Arbuckle pay at 3,587-91 ft.

**KANSAS WILDCAT COMPLETIONS**

Barton County: Bradley Brothers 1 Konecny, NE NE SE 30-17-13w, dry, TD 3,430 ft., Arbuckle 3,405 ft.

W. L. Hartman 1 Knap, NW SW SW 2-20-12w, dry, TD 3,403 ft., Arbuckle 3,345 ft.

Edwards County: Stanolind 1 Schultz, SE SE SW 10-26-16w, dry, TD 4,805 ft., Arbuckle 4,721 ft.

Graham County: Phillips 1 Kirk, NW NW NE 28-10-24w, dry, TD 4,578 ft., Arbuckle 4,540 ft.

McPherson County: Phillips 1 Abe, NE

(Continued on page 126)


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1—8 K.W. portable rig light plant, unitized with X.A.H. Wax. motor, completely overhauled, ready for service.
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**#1 USED PIPE**

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20,000 ft. 5" O.D. 17# T &C Range I line pipe.
100,000 ft. 2" plain tubing T & C 4.50#, make excellent line pipe—2,500# test.

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Cross Sectional View shows the simple design with the float chamber welded to the tubing section of the valve. Below the float, shown in raised position, are the slotted ports for entry of fluid from the annular space; the other port leading down below the seat permits entry of fluid from the tubing. Gas will not operate the float.

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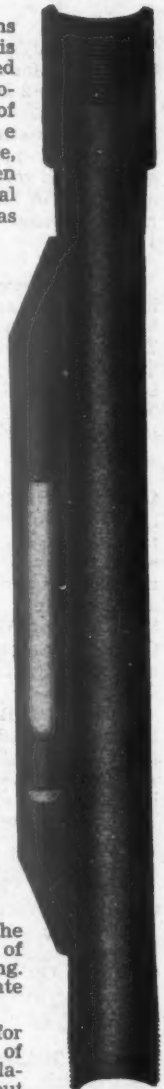

*Cross Section View*

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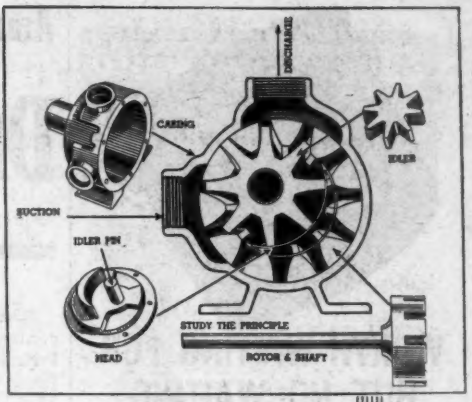


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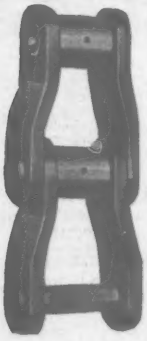

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## Among the

# Drilling Contractors

**Newell & Chandler,** Calgary, have contract for eight wells for Empire Petroleums of Calgary in the Taber field with first location in LSD 4, 15-6-15w4, southeast of the original Taber discoveries and close to the new Conrad-Province 150-bbl. producer.

**H. M. Williams** has the drilling contract on the W. D. Moorer et al 1 Ehlert, in SE cor. 7-27-4w, Sedgwick County, Kansas. Rig was being built for the wildcat test for oil ½ mile south of the abandoned Cheney pool. Production will be sought in the Arbuckle.

**Mercury Drilling Co.** is reported to be expanding its operations in Kansas, and has employed Harold E. McNeil as geologist. The new geologist has previously been associated with Great Lakes Carbon Co. and Derby Oil Co.

**Richmond Drilling Co.** was getting under way on its 1 J. W. Nelson, a new 5,200-ft. wildcat 14 miles northwest of Lamesa, Dawson County, West Texas. The site is in the C SW NW 34, Block M, EL&RR Survey.

**Loffland Brothers** has been awarded drilling contract on Humble Oil & Refining Co. 1 Pruet Keel, an 8,500-ft. wildcat to explore the Ordovician, in north central Mitchell County, Texas. Location is 660 ft. from the south and 1,980 ft. from the east lines of Section 22, Block 27, TP (16-Mile Reserve). Drilling will be with rotary.

**Byars Drilling Co.,** having completed Sinclair Prairie Oil Co. 1 Hoag, in SW SW NE 23-17n-4w, in the Crescent field, Logan County, Oklahoma, is moving to the 2 Hoag, in SW NE NE 23-17n-4w.

**Big Chief Drilling Co.** has the contract on Mid-Continent Petroleum Corp. 2 Westermeier, in NE NW SW 26-10n-3w, a north offset to the discovery well. Conductor pipe has been set at 62 ft.

**Standard Drilling Co.** will drill a test H. C. Hageman has started on the 1 A. J. and D. L. Stofleth and H. Cokes in NE NE NW 34-7s-10e, White County, Illinois. The test is a Sun Oil Co. farmout and is the south offset to the 2 B. C. Goforth.

**E. H. Christian Drilling Co.,** Los Angeles, is preparing to spud a second well on the Butler property at McVan in Kern County, California, for Butler Brothers Oil Co. in 14-27s-27e.

**Slim Hampton, Inc.,** Los Angeles, has spudded another outpost well for Reserve Oil & Gas Co. in the Tejon Ranch area in southern Kern County, California. Discovery of a field last year by Richfield in the Tejon area has stimulated interest in adjacent acreage.

**Ed Rumley,** rotary drilling contractor of Oklahoma City, who has his tools running in the West Edmond field for Ace Gutowsky, is associated with another operator in the Cooper and Rumley 1 Tolbert, a wildcat test, in NE NW SW 14-3n-1e, east of Pauls Valley in Garvin County, Oklahoma, being drilled on a Sun Oil Co. farmout.

**Barbour Drilling Co.** has been awarded the drilling contract on the Gulf Oil Corp. 1 Bob Good, a wildcat in SE SE NE 28-30s-12w, Barber County, Kansas. Sinclair Prairie Oil Co. is contributing to the test.

**Johnson & Flesher** has a 9,000-ft. drilling contract on the Fox & Fox 1 Dirickson, in C NE NE 18-12n-19w, west of Stafford, in Custer County, Oklahoma, which was drilled to 7,100 ft. and was running electric log.

**Nelson Drilling Co.** has the contract to drill the Bay Petroleum Co. and Westgate-Greenland 1 Myers, in NE NE NW 7-19-1, McPherson County, Kansas, 1 mile south of Derby Oil Co. 1 Day producer. The operators have approximately 700 acres around the drilling well, which was drilling below 1,820 ft.

**Bryan Petroleum Co.** is the drilling contractor on the Wakefield & Gordon 1 Zweigel, in SE NW SW 19-8s-6e, in the Isom Springs area of Atoka County, Oklahoma, which was being drilled on below 905 ft.

# OKLAHOMA

## W. Edmond Passes 100 Producing Well Mark

THE West Edmond field passed the 100 producing well mark this week and also had what is becoming an almost weekly performance, another extension, this one a ½-mile east extension on the south side, where the Denver Producing & Refining Co. 1 Stillington, NW NW 10-13n-4w, found the Bois d'Arc section of the Hunton at 6,650-93 ft., drilled to a total depth of 6,775 ft., washed with acid and started flowing into the tanks. No gage was available.

**Carter County.**—In the Lone Grove pool, The Texas Co. 1 Duke, SE SW NW 5-5s-1w, opened a new deeper Pennsylvanian sand pay zone. The well was perforated at 3,601-05 ft., and showed oil with some water, squeezed and reperforated, and flowed 26 bbl. of oil per hour for 20 hours, with a water grind out of ½ of 1 per cent. Electric log surveys showed seven potential pay zones, of which the present zone appeared to be the poorest, so further tests will be made of the shallower zones before final completion.

**Cleveland County.**—Sinclair Prairie Oil Co. 1 Theimer, NE SE SW 20-10n-3w, 1 mile north of the West Moore pool discovery well, which was dry in the Wilcox at total depth of 9,280 ft., is attempting to find production in the Simpson. When perforated at 8,556-80 ft., it showed some oil, but lots of water. It will be reperforated at 8,556-70 ft. for another test of the Simpson and if this fails, the Hunton will be tested.

**Garvin County.**—The East Pauls Valley pool with its three pay zones, is getting two new producers and a dry hole. Gilmer Oil et al 1 Stubblefield, SW SW SE 7-3n-3e, after acidizing the Pennsylvanian chert at 3,079 ft., total depth, swabbed and flowed 90 bbl. in 5 hours. Ohio Oil Co. 2 Burns, SW NE SE 17-3n-3e, had the Bromide at 3,172-86 ft., perforated at 3,170 ft., acidized and started flowing oil. Magnolia Petroleum Co. 1 Ross, NE SE NW 19-3n-3e, an edge well, drilled to 3,405 ft., with no shows.

**OKLAHOMA WILDCAT COMPLETIONS**

Creek County: L. B. Jackson 1 Childers, SE SE NW 32-18n-9e, dry, TD 3,268 ft., Woodward 3,190 ft.

Garvin County: Ohio Oil 1 McKinney, SW NE SE 18-3n-2e, flowed 119 bbl. through 5/16-in. choke, pay zone 2,868-89 ft., TD 2,892 ft.

(Continued on page 130)

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# OHIO, KENTUCKY

## Meigs County Berea Well Flows 65 Bbl. Per Day

COLUMBUS.—The third oil well, Preston Oil 2 Midkiff and Hoskins, Section 3, was completed in the Hoyt Town gas and oil pool in southeastern Bedford Township, Meigs County. Berea sand at 1,821-36 ft. was shot and the well flowed 65 bbl. in 24 hours. The company has started another well two locations to the south.

The Lime sand pool in Section 1, Franklin Township, Monroe County, was extended by a 40-bbl. producer, Luberg Oil & Gas Co. 5 J. C. Luberg. Sand was logged at 1,256-1,268 ft.

A new gas pool is indicated in the west side of Washington Township, Holmes County, where Carl Robinson 1 F. A. Ullman, Section 6, had the Clinton at 2,884-93 ft., gauging 618,000 cu. ft., and the second sand at 2,914-23 ft. gauging 161,000 cu. ft. The well was shot and shut in at 526,000 cu. ft. with 1,035 lb. pressure.

**OHIO WILDCAT COMPLETIONS**

Holmes County, Washington Township: Robinson et al 1 F. A. Ullman, Sec. 6, Clinton 526,000 cu. ft., TD 2,926 ft.

Muskingum County, Springfield Township: Atha 1 E. G. Schultz, Sec. 5, Clinton 3,705-3,735 ft., Medina 3,799-3,809 ft., dry, TD 3,893 ft.

**INDIANA WILDCAT COMPLETIONS**

Wells County: Texas 1 R. Aschliman, SE SE SE 7-27n-13e, dry at 1,164 ft. after shot and acid but not permanently abandoned.

Daviess County: Stanbaugh Bros. 1 Kneiss, SE SE NE 22-3n-6w, dry at 770 ft. Upper Glen Dean 534 ft., Paint Creek 674 ft., Benoist 739 ft.

(Continued on page 126)

## Possible New Pool Opener in Mississippi

JACKSON.—S. W. Richardson 1 Berry, SE NW 24-9n-19w, a wildcat in Jeff Davis County, about 60 miles west and a little south of the Eucutta pool, is reported showing for a distillate well from pay at 8,120-32 ft., flowing through three separators.

**MISSISSIPPI WILDCAT COMPLETIONS**

Madison County: Carter-Phillips 1 Nancy Nichols, NW SW 5-10n-4e, dry, TD 6,568 ft., Selma 3,948 ft., Eutaw 4,945 ft., Tulscaloosa 5,620 ft., Marine Tuscaloosa 5,960 ft., Massive 6,219 ft., Lower Cretaceous 6,426 ft.

Wayne County: T. F. Hodge 1 Masonite, SW SE 23-10n-9w, dry, TD 7,060 ft., chalk 3,917 ft., Eutaw 5,103 ft., Tuscaloosa 5,650 ft., Marine Tuscaloosa 6,445 ft., Massive 6,751 ft., Lower Cretaceous 6,997 ft.

Claiborne County: Sun Oil 1 Hammet, 2-11n-1w, dry, TD 1,837 ft. Blew out while coring, bridged, plugged and abandoned.

**NORTH LOUISIANA WILDCAT COMPLETION**

Bossier Parish: O. F. Shaver 1 Gaines, NE NW SW 8-21n-13w, dry, TD 1,340 ft.


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TUBBS CORDAGE CO.
SAN FRANCISCO

# PERSONALS

## Liked Because He Doesn't Act the Big Shot

EXPRESSIONS of satisfaction greeted the recent announcement that William A. Alexander had been promoted to acting manager of the Texas Gulf Coast area for Shell Oil Co., Inc., with his headquarters in Houston. He is known generally as "Alec" among his fellow workers, who say he never plays the big shot. And they add that men under his supervision are always sure of fair, understanding treatment of their problems when they go to him.

Alexander joined Shell in 1928 as a production engineer. After working in various fields of the Gulf Coast area he spent some time in The Hague, Netherlands. On his return to this country he was made division superintendent in charge of production in Louisiana, and from there he went to the Houston office as exploitation engineer and assistant production manager. On the death of H. J. Kemler he was advanced to his new post.

Born in Crowley, La., Alexander graduated from Louisiana State University. He began his oil career with Rycade Oil Co.

**O. B. Hopkins,** Ph.D., has been appointed vice president in charge of producing operations of Imperial Oil, Ltd. Hopkins joined Imperial in 1919. A year later he went to Colombia to evaluate the De Mares concession, subsequently acquired by International Petroleum Co., Ltd., and on his return to Canada in 1921 was appointed chief geologist of Imperial Oil. Hopkins will be succeeded as chief geologist of Imperial by **O. C. Wheeler,** formerly resident geologist in Colombia and subsequently chief geologist of International Petroleum and assistant chief geologist of Imperial. **Dr. T. A. Link,** now resident geologist in Western Canada, will go to Toronto as assistant chief geologist for Imperial.

**L. K. Worth,** formerly assistant general superintendent of Stanolind Oil & Gas Co., Tulsa, has been made operating superintendent, a new post. **K. W. Bolt,** who was petroleum engineering supervisor, has been advanced to assistant to the operating superintendent. **W. M. Elias** has been promoted from senior petroleum engineer to the new position of assistant unitization supervisor.

**R. H. Gwinner,** formerly senior exploitation engineer for Shell Oil Co., Inc., has joined Sunray Oil Corp. as chief engineer. Prior to joining Shell in 1934, Gwinner was employed by an independent company as production engineer in Louisiana and Arkansas, and later was with a consulting engineering firm, where his work covered the Mid-Continent and Appalachian areas. While with Shell, Gwinner's duties extended over the Mid-Continent region.

*CARL H. METZ, JR.*

**Carl H. Metz, Jr.,** superintendent of No. 1 refinery of The Standard Oil Co. (Ohio), in Cleveland, since 1937, was promoted to manager last week. Metz, a graduate of The Citadel, spent 3 years with American-owned refineries in Mexico before joining Sohio in 1927 as cracking-coil stillman. **I. L. Peterson,** assistant superintendent of No. 1 refinery since 1937, was named superintendent of maintenance and construction. Following his graduation from University of Illinois in 1924, Peterson joined Sohio as a draftsman. **E. S. Bale,** in charge of the company's technical service division since 1939, was named superintendent of process at No. 1 refinery. A graduate of Case School of Applied Science, Bale joined Sohio in 1939 as process control man. **Joseph J. August,** cracking-coil foreman at No. 1 refinery for the past year, succeeds Bale as chief of the technical service division.

**J. Doyle Settle,** formerly district rationing executive for Office of Price Administration, Lubbock, Tex., has been employed by American Association of Oilwell Drilling Contractors as part of the expansion program voted earlier in the year by the executive committee. Settle has been identified with educational and industrial development in West Texas for many years.

**James K. Hufendick,** district superintendent for The Texas Co., in charge of the territory comprising Illinois, Indiana and Kentucky, with headquarters in Salem, Ill., is to leave soon for Colombia, where he will be assistant manager of Texas Petroleum Co. in Bogota. He will be succeeded at Salem by **A. L. Kraft,** now field foreman under Hufendick.

**Albert B. Hockman,** assistant field engineer at the Wilmington, Calif., refinery of Shell Oil Co., Inc., has been promoted to field engineer at Ventura, in the coastal division. **Robert J. Kettenburg,** division engineer, has been transferred from the Los Angeles Basin division to the coastal division.

**Charles B. Karns,** manager of the Pittsburgh works of Standard Oil Co. of Pennsylvania, was reelected a director of the company at the annual meeting.

**C. S. Gentry,** secretary and general counsel of Shell Oil Co., Inc., New York, has been appointed a vice president. He will retain his previous posts. Gentry joined Shell in 1933. He graduated from McKendree College, received his master's degree from University of Illinois, and attended Oxford College as a Rhodes scholar.

**Ray Varnum,** for several years affiliated with Gilmore Oil Co. in Los Angeles, has been appointed manpower representative for District 5 of Petroleum Administration for War.

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## MARKET QUOTATIONS

**Prices as of August 8, 1944**

**(This service is abbreviated because most refinery products are selling at the Government's price ceilings. Quotations on other products than those shown here furnished on request. Quotations are f.o.b. plant in tank cars and in cents per gal-**

### REFINERY GASOLINE

| Octane (A.S.T.M.): | 80† | 72-74 |
|---|---|---|
| Mid-Continent | 6.00-6.25 | 5.750-6.000 |
| Gulf Coast | 6.00-6.50 | ‡5.750-6.250 |
| Northeast Coast | 9.80 | 9.200 |
| California | | 8.255-8.500 |

*Basis Oklahoma Group 3. †1939 C.F.R. (research method.) ‡Unleaded.

### NATURAL GASOLINE

| Grades: | 25-70 | 18-55 |
|---|---|---|
| Oklahoma (Group 3) | 4.750 | 5.700 |
| North Texas | 4.375 | 5.250 |
| North Louisiana | 4.375 | 5.250 |
| California | 4.875 | 5.500 |

### CRUDE-OIL PRICES

| Representative posted schedules per bbl. | |
|---|---|
| East Texas | $1.25 |
| Conroe | 1.43 |
| Tepetate, Louisiana | 1.18 |
| Illinois basin | 1.37 |
| Pecos County, Texas | .95 |
| Bradford, Pennsylvania | 3.00 |
| Van, Van Zandt County, Texas | 1.08 |

Note: Exclusive of subsidy.

### A.P.I. REFINERY REPORT

**Week Ended July 29, 1944**

**(Figures in thousands of barrels)**

| | Dly. crude runs to stills | Stocks—Gasoline | Stocks—Residual | Stocks—Gas oil |
|---|---|---|---|---|
| Appalachian | 150 | 3,778 | 467 | 641 |
| Ind., Ill., Ky. | 758 | 18,091 | 4,087 | 5,858 |
| Okla., Kan., Mo. | 362 | 6,799 | 1,540 | 1,779 |
| Censored area* | 2,432 | 37,473 | 16,948 | 20,481 |
| Rockies | 111 | 2,275 | 640 | 351 |
| California | 814 | 14,249 | 32,598 | 9,025 |
| Total 7-29-44 | 4,627 | 82,665 | 56,280 | 38,135 |
| Total 7-22-44 | †4,670 | 82,150 | 55,315 | 37,513 |
| Total 7-31-43 | 3,769 | 73,409 | 67,361 | 34,328 |

*Reports combined on East Coast, Texas Gulf Coast, Louisiana-Arkansas and Inland Texas at request of PAW. †Revised—California reduced 14,000 per day.

### CRUDE-OIL STOCKS

**(Bureau of Mines Estimate)**

| Week ended: | Bbl. of crude* |
|---|---|
| July 29, 1944 | 225,112,000 |
| July 22, 1944 | 225,294,000 |
| July 31, 1943 | 238,420,000 |

*Excludes unrefinable California stocks.

## CALENDAR

**September**

A.C.S., 1944 fall meeting, Pennsylvania Hotel, New York, September 11-15.

N.P.A., annual meeting, Hotel Claridge, Atlantic City, N. J., September 20, 21, 22.

**October**

I.P.A.A. board of directors, Dallas, Tex., October 9-11. (Takes place of anniversary meeting previously scheduled.)

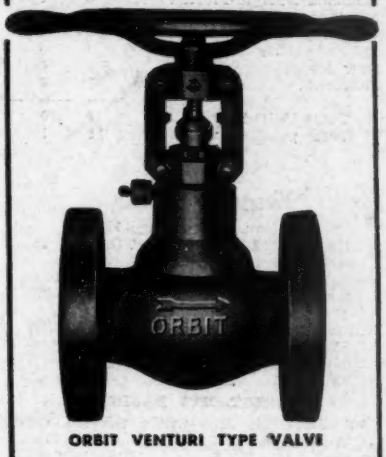
C.N.G.A., annual meeting. Biltmore Hotel, Los Angeles, October 13.

**November**

A.C.S., third national chemical exposition, Coliseum, Chicago, November 15 to 19.

SAND
VS
WING VALVES

The **ORBIT VENTURI TYPE VALVE** is manufactured with Stellite "J" Metal Seats which will not only withstand the abrasion of sand but is also corrosion resistant to all type of crude oil.




ORBIT VENTURI TYPE VALVE

This valve can be furnished thru all fabricators of Xmas Trees or thru any of your local supply stores at a price comparable to that of leading plug valves **YET** this valve requires no lubrication to effect a seal.

See Pages 2194 to 2211 in 1944 Composite Catalog

*Specify*
ORBIT VALVES

OIL WELL IMPROVEMENTS COMPANY
TULSA OKLAHOMA

## WILDCAT COMPLETIONS AND DISCOVERIES

| | Week ended Aug. 5, 1944 | | | | | Cumulative total, 1944 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Oil | Dist. | Gas | Dry | Total | Oil | Dist. | Gas | Dry | Total |
| Ohio | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 10 | 42 | 52 |
| Indiana | 0 | 0 | 0 | 2 | 2 | 3 | 0 | 0 | 15 | 18 |
| Illinois | 2 | 0 | 0 | 11 | 13 | 18 | 0 | 0 | 193 | 211 |
| Kentucky | 0 | 0 | 0 | 4 | 4 | 6 | 0 | 0 | 42 | 48 |
| Michigan | 0 | 0 | 0 | 4 | 4 | 6 | 0 | 2 | 149 | 157 |
| Kansas | 0 | 0 | 0 | 7 | 7 | 34 | 0 | 5 | 254 | 293 |
| Nebraska-Missouri-Iowa | 0 | 0 | 0 | 2 | 2 | 1 | 0 | 0 | 9 | 10 |
| Oklahoma | 2 | 0 | 0 | 8 | 10 | 38 | 0 | 17 | 150 | 205 |
| Texas: | | | | | | | | | | |
| North Central | 0 | 0 | 0 | 8 | 8 | 39 | 0 | 1 | 177 | 217 |
| West | 1 | 0 | 0 | 10 | 11 | 18 | 0 | 3 | 105 | 126 |
| Panhandle | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 6 | 6 |
| Eastern | 0 | 0 | 0 | 1 | 1 | 4 | 0 | 1 | 81 | 86 |
| Gulf Coast | 1 | 0 | 0 | 9 | 10 | 24 | 9 | 11 | 137 | 181 |
| Southwest | 0 | 0 | 1 | 7 | 8 | 17 | 4 | 13 | 143 | 177 |
| Total Texas | 2 | 0 | 1 | 36 | 39 | 102 | 13 | 29 | 649 | 793 |
| Louisiana: | | | | | | | | | | |
| Northern | 0 | 0 | 0 | 1 | 1 | 3 | 0 | 0 | 33 | 36 |
| Southern | 0 | 0 | 0 | 0 | 0 | 5 | 6 | 0 | 33 | 44 |
| Total Louisiana | 0 | 0 | 0 | 1 | 1 | 8 | 6 | 0 | 66 | 80 |
| Arkansas | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 31 | 34 |
| Mississippi | 0 | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 44 | 46 |
| Alabama-Georgia-Florida | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 12 | 14 |
| Montana | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 1 | 20 | 23 |
| Wyoming | 0 | 0 | 0 | 1 | 1 | 10 | 0 | 1 | 11 | 22 |
| Colorado-Utah | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 21 | 23 |
| New Mexico | 1 | 0 | 1 | 0 | 2 | 4 | 0 | 2 | 35 | 41 |
| California | 0 | 0 | 0 | 6 | 6 | 4 | 0 | 5 | 126 | 135 |
| Total United States | 7 | 0 | 3 | 88 | 96 | 244 | 20 | 72 | 1,869 | 2,205 |
| Total previous week | 11 | 1 | 1 | 77 | 90 | | | | | |

## Kansas Fields

(Continued from page 120)

NE NW 28-21-5w, dry, TD 4,043 ft., Arbuckle 4,010 ft.

Norton County: Allen & Aylward 1 Porter, NW NW NW 26-3-24w, dry, TD 3,743 ft., granite wash 3,697 ft.

Phillips County: Texas 1 Witt, SW SW SW 35-5-20w, dry, TD 3,563 ft., Reagan 3,552 ft.

### FOREST CITY BASIN

ST. JOSEPH, Mo.—Cities Service Oil Co. 2 Watkins, NW SE NW 32-65n-39w, set casing at 1,387 ft. and drilled to 1,391 ft., where it pumped 5 bbl. per day. The well is to be deepened. The same company's 3 Watkins, NW SW NW 32-65n-39w, west offset to 1 Watkins, pumped 27 bbl. of oil and 4 bbl. of water from 1,442 ft. Dan Short 1 Giffen, NW NW 15-65n-40w, Atchison County, had a good showing of oil in stray sand at 1,337-41 ft.

### MISSOURI WILDCAT COMPLETION

Atchison County: Homer Browning 1 Homer Browning, S/2 SW 28-64n-40w, dry, TD 1,564 ft.

### NEBRASKA WILDCAT COMPLETION

Richardson County: Bates 1 Zervagie, E/2 SE NE 13-3n-16e, dry, TD 2,642 ft., Mississippi lime 2,167 ft., Hunton 2,632 ft.

## Kentucky Fields

(Continued from page 123)

### SOUTHERN KENTUCKY

ALBANY.—Five oil wells were completed in the Clinton County area last week with a total initial production of 120 bbl. per day natural, the wells ranging from 14 bbl. to 40 bbl. Sam Jarvis 1 J. Pierce, initially completed as a 14-bbl. well, was acidized and increased to 50 bbl. This is the first well with all preparations for a thorough job of acidization considered in setting casing in completing.

There are now 20 wells drilling in Clinton County; two charters have been granted by the state for construction of pipe lines, and a 150-bbl. shut-down skimming plant, a few miles from the field, used during the Wolf Creek dam construction period, will be reopened by C. L. Bell and L. C. Roberts of Louisville.

### EASTERN KENTUCKY

ASHLAND.—Operations in the Eastern Kentucky area displayed a slight increase during the past week and four wells were completed, including one oil well, one gas well and two dry holes.

Ashland Oil & Refining Co. 7, on the 160-acre Bruce Northcutt tract in Menifee County, was completed as a 10-bbl. well, but its 1 and 2 on the east end of the same tract were dry.

The Kentucky West Virginia Gas Co. completed 749 F. W. Newsome et al, on Dry Branch of Big Mud Creek in Floyd County, at 2,912 ft. in shale with an open flow of 412,000 cu. ft. of gas after shot.

### WESTERN KENTUCKY WILDCATS

Butler County: Hobson et al 1 Heck, CSL SE SW SE 23-I-32, dry at 512 ft. Base of Pennsylvania 375 ft.

Daviess County: Producers P. L. Co. 1 Goode, 1 mi. SE of Mosleyville, dry at 1,936 ft. Glen Dean 1,304 ft. Barlow 1,540 ft., Ste. Genevieve 1,741 ft., McCloskey 1,785 ft.

Muhlenburg County: Miller & Mullins 1 Hunt, CWL SE NE SE 16-H-32, dry at 455 ft. Glen Dean 306 ft., Hardinsburg 391 ft., Golconda 420 ft.

Union County: Stephen Horan 1 Mills, SW SW SE 22-P-19, dry at 1,920 ft. Lower Menard 1,776 ft., Tar Springs 1,891 ft.

## Rocky Mountain Map Series Completed

Oil field maps on three Rocky Mountain states, Colorado, Wyoming and Montana have been completed and published by E. C. Jacobson, McBirney Building, Tulsa. The maps show oil fields in green, gas fields in red and carry an index giving official field names and locations by township and range. The crude-oil and natural-gas lines are labeled with names of operating companies and with size of the pipe. Operating refineries are located with their daily crude-oil capacity shown in barrels.

# Equipment News

## Kerr Sales Manager for Combined Organizations

Col. Willard F. Rockwell, president of Pittsburgh Equitable Meter Co.-Merco Nordstrom Valve Co., has announced the appointment of A. J. Kerr as general sales manager for the combined organizations. Kerr, a veteran of 20 years with the company, was district manager of the firm's midwest headquarters at Tulsa prior to his Pittsburgh home office appointment.

Kerr's first official act as sales manager was to appoint M. D. Gilbert as district manager of the Tulsa office, C. K. Madison as district manager of the Houston office, and W. S. Andrews as district manager of the Pittsburgh office of the company. Gilbert and Madison formerly served as service engineers in the Midwest territory, which includes the states of Arkansas, Louisiana, New Mexico, Texas and Oklahoma. Andrews, formerly a service engineer out of Pittsburgh, has more recently traveled Ohio for the company.

## Cline to Represent Texasteel In Tulsa Territory

L. P. Cline, of Texasteel Manufacturing Co., of Fort Worth, has been transferred to Tulsa from Wichita Falls, Tex., to become the Tulsa resident representative of the company. He has represented the company in Wichita Falls for past 3 years.

## Bain Heads Tulsa Office For Thornhill-Craver

The Thornhill-Craver Co., of Houston, oil-field equipment manufacturer not previously represented in this area, has established a district sales office in Tulsa.

J. D. Bain has been appointed district sales representative, with his territory to include Oklahoma, Kansas and the North Texas area.

## Briggs Clarifier Appoints Zone Managers and Distributors

Briggs Clarifier Co. has appointed the following zone managers and distributors:

Thomas W. McKinley, who has been with the company since 1941, in the capacity of service engineer, has been appointed southeastern zone manager, covering all states south of Maryland and east of West Virginia, Tennessee and Mississippi. He will make his headquarters in Atlanta.

Donn Murphy has been appointed southwestern zone manager, covering Texas, Oklahoma, Kansas, Missouri, Arkansas, and Louisiana, with headquarters in Dallas. Prior to his appointment, Murphy was previously with M & M Industrial Supplies, Dallas.

A. H. Martin has been appointed western zone manager, with headquarters in San Francisco. Prior to his appointment, Martin worked for 3 years with western distributors as sales and service engineer for the company.

## Wickwire Spencer Buys Sirian Wire & Contact Co.

Wickwire Spencer Steel Co. announced the purchase of the business and assets of Sirian Wire & Contact Co. of Newark, N. J. The steel company assumes full control of all management and production operations of Sirian.